VOLUME 1: CHAPTER 8: ORNITHOLOGY

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8. ORNITHOLOGY

8.1 Executive Summary

8.1.1 This Chapter considers the potential effects of the Proposed Development on ornithological features and reaches conclusions as to the predicted likely significance of effects on ornithology. It details the methods used to establish the bird species and populations present that may be affected by the Proposed Development, together with the process used to determine their importance. The ways in which birds might be affected (directly or indirectly) by the Proposed Development are explained and an assessment is made with regards to the significance of these effects.

8.1.2 Baseline ornithology field surveys of the Proposed Development and surrounding area were carried out between October 2018 and August 2019, and between May and July 2022. Additionally, a desk study was completed to supplement the field survey results.

8.1.3 Based on the results of the field surveys and desk study, the following Important Ornithological Features (IOFs) were identified: Caithness and Sutherland Peatlands Special Protection Area (SPA) and Ramsar site, West Halladale Site of Special Scientific Interest (SSSI), Lochan Buidhe Mires SSSI, golden plover (*Pluvialis apricaria*), greenshank (*Tringa nebularia*), red-throated diver (*Gavia stellata*), black-throated diver (*Gavia arctica*), osprey (*Pandion haliaetus*), hen harrier (*Circus cyaneus*), merlin (*Falco columbarius*) and white-tailed eagle (*Haliaeetus albicilla*).

8.1.4 An assessment of potential effects of the Proposed Development on each IOF during construction and operation was completed. Potential cumulative effects were also considered for relevant IOFs.

8.1.5 Ornithological sensitivities were taken into consideration during the design of the Proposed Development, with the layout designed to minimise potential effects on IOFs where possible. Embedded mitigation would comprise implementation of a Bird Protection Plan (BPP) to safeguard breeding birds and roosting raptors listed on Schedule 1A to the Wildlife and Countryside Act 1981 (as amended) (W&CA).

8.1.6 To reduce collision risk to breeding red-throated diver and hen harrier, line markers would be installed along sections of the overhead line (OHL) component of the Proposed Development where these species are considered to be at greatest risk of collision.

8.1.7 Additionally, specific mitigation for breeding hen harrier is proposed to reduce potentially significant effects due to displacement resulting from habitat loss during construction of the Proposed Development, or due to operational disturbance. This would be delivered via a landscape scale Outline Habitat Management Plan (HMP) detailed in **Appendix 7.8: Connagill Cluster Outline Habitat Management Plan**, which aims to combine the HMPs for the Connagill Cluster Grid Connection projects, and is being developed in consultation with NatureScot.

8.1.8 The hen harrier mitigation would benefit other upland bird species such as breeding waders. Additional enhancement measures proposed for IOFs include installation of artificial nest rafts for breeding diver species to provide additional nest sites.

8.1.9 It is also proposed that a programme of ornithological monitoring is undertaken by a suitably experienced and licensed ornithologist during construction of the Proposed Development, comprising surveys for breeding waders, raptors and divers, including checks of any artificial diver nest rafts installed.

8.1.10 Following implementation of embedded and targeted mitigation measures, no significant residual effects are predicted on any IOFs as a result of the Proposed Development.

8.2 Introduction

8.2.1 This Chapter considers the potential effects, including cumulative effects, of the Proposed Development on ornithological interests during construction and operation, and reaches conclusions as to the predicted likely significance of effects on ornithology. It details the methods used to establish the bird species and populations present that may be affected by the Proposed Development, together with the process used to determine their importance. The ways in which birds might be affected (directly or indirectly) by the Proposed Development are explained and an assessment is made with regards to the significance of these effects.

8.2.2 Additionally, the Chapter and Appendices set out information to allow Scottish Ministers to undertake an Appropriate Assessment of the effects of the Proposed Development on the Caithness and Sutherlands Peatlands SPA. Further information relating to the Appropriate Assessment process is provided in **Appendix 8.4: Shadow Habitats Regulations Assessment for the Caithness and Sutherland Peatlands Special Protection Area (SPA) (Confidential).**

8.2.3 The assessment reported in this Chapter is based on the key characteristics of the Proposed Development as detailed in **Chapter 3 - The Proposed Development.** This Chapter should be read in conjunction with **Appendices 8.1 - 8.3** included in Volume 4 of this EIA Report, which provide detailed information on the desk study and ornithology survey methods and results, as well as **Appendix 8.4,** which considers potential effects on the Caithness and Sutherland Peatlands SPA, as part of a shadow Habitats Regulations Appraisal (HRA).

8.2.4 **Chapter 7 – Ecology** is also of particular relevance to this Chapter because it identifies and assesses potential effects on habitats, which support ornithological features, as is **Appendix 7.8: Connagill Cluster Outline Habitat Management Plan (HMP) Shadow HRA for the Caithness and Sutherland Peatlands SAC / Ramsar**, outlines a strategy to compensate and enhance habitat quality to benefit ecological and ornithological receptors, including hen harrier, which is one of the IOFs identified in this Chapter.

8.2.5 This assessment has been carried out by RPS Group. A table presenting relevant qualifications and experience of key staff involved in the preparation of this Chapter is included in **Appendix 5.1**, contained within Volume 4 of this EIA Report.

8.3 Scope of Assessment

Study Area

8.3.1 The study area varied according to the survey type and desk study dataset.

8.3.2 For the search for designated sites of ornithological importance and data requests completed as part of the desk study, the study area comprised the Proposed Development and the following buffer areas around it:

- 20 km search area for statutory sites of international importance designated for one or more goose species;
- 10 km search area for statutory sites of international importance designated for other species;
- 6 km for records of eagle species; and
- 2 km search area for statutory sites of national importance, non-statutory sites of ornithological importance and records of other bird species of conservation concern.

8.3.3 For the review of existing ornithological data completed as part of the desk study, the study area comprised the ornithology survey areas for the operational Strathy North Wind Farm and the consented Strathy Wood Wind Farm, as well as two vantage point (VP) viewsheds used for the proposed Strathy South Wind Farm 'Northern Section' Grid Connection[1]. The most recent (2016-19 and 2021) ornithology survey areas for Strathy North

[1] Note that these data are not publicly available.

Wind Farm are shown in **Figures 8.1a and 8.1b** within Volume 2 of this EIA Report, while the Strathy South Wind Farm 'Northern Section' Grid Connection VP locations and viewsheds are shown on **Figure 8.1c**. Details of the Strathy Wood Wind Farm survey areas are included in the 2019 Further Environmental Information (FEI) (Atmos, 2019).

8.3.4 Ornithology field surveys of the Proposed Development were completed in 2018-2019 and the study area comprised suitable habitat within the footprint of the optimal route option of the Proposed Development at that time (which was similar to the Proposed Development), with survey-specific buffers (500 m for the moorland breeding bird survey, 1.5 km for the black grouse survey, and 2 km for the scarce breeding bird survey). The survey areas are shown on **Figure 8.2a** within Volume 2 of this EIA Report.

8.3.5 Similarly, a scarce breeding bird survey was completed in 2022 for the Proposed Development, based on the optimal route option of the Proposed Development at that time (which was similar to the Proposed Development), and a surrounding 500 m buffer. The survey area is shown on **Figure 8.2b** within Volume 2 of this EIA Report.

8.4 Consultation

8.4.1 To inform the scope of the assessment for the Proposed Development, consultation was undertaken with statutory and non-statutory bodies. **Table 8.1** summarises the scoping responses relevant to ornithology and provides details of where/how these have been addressed in this EIA.

8.4.2 Further details on the consultation responses and scoping opinion can be reviewed in **Chapter 4 - Scope and Consultation**, and associated appendices.

Table 8.1: Summary of Scoping Responses

Organisation & Date	Summary of Consultation Response	EIA/Design Response to Consultee
NatureScot 12th April 2024	Advised that impacts to protected sites is a key issue and the Proposed Development has the potential to significantly affect the Caithness and Sutherland Peatlands SPA. Further advised that this will need to be carefully considered as part of the Environmental Impact Assessment (EIA), and indirect impacts on the SPA and its qualifying features (i.e., the species for which the SPA is designated) should be assessed in the context of its conservation/ management objectives. The EIA should consider the impact of the Proposed Development both as a single development and cumulatively with other relevant developments affecting the SPA.	Potential impacts on the qualifying features of the Caithness and Sutherland Peatlands SPA are considered in Sections 8.10 and 8.13 of this Chapter and, where relevant, proposed mitigation is presented in Section 8.11. Potential effects on qualifying features of the Caithness and Sutherland Peatlands SPA are also considered in **Appendix 8.4**.

Organisation & Date	Summary of Consultation Response	EIA/Design Response to Consultee
	Advised that consideration must be given to SPA bird species so that the conservation objectives of the site can be maintained. Further advised that the Proposed Development is likely to disturb and possibly displace SPA species (e.g., waders) through construction activity, and there may also be significant effects on other species, such as red-throated diver, which would have to avoid overhead lines whilst flying to and from the sea to feed during the breeding season.	Potential impacts, including disturbance/displacement and collision risk, affecting IOFs, including qualifying features of the Caithness and Sutherland Peatlands SPA, such as wader species and red-throated diver, are discussed in Sections 8.10 and 8.13 of this Chapter and, where relevant, proposed mitigation is presented in Section 8.11. Potential effects on designated ornithological features of these sites are also considered in **Appendix 8.4**.
	Advised that the wind farm development which is to be connected by the Proposed Development, and other nearby wind farm developments, will provide useful information with respect to SPA species distribution and movement and recommended that they are consulted.	Data was requested from wind farm developers connected to the Connagill Cluster Grid Connection projects. The datasets that were shared were reviewed as part of the desk study and relevant data was used to inform the Ornithological Impact Assessment (OIA) detailed in Sections 8.10 and 8.13. As detailed in **Appendix 8.1: Ornithology Technical Report**, the most recent available data from the operational Strathy North and consented Strathy Wood wind farms were reviewed as part of the desk study and relevant data was used to inform the OIA detailed in Sections 8.10 and 8.13.
	Advised that the Proposed Development may result in impacts on the population and distribution of birds within the Flow Country World Heritage Site (WHS) without mitigation.	Potential impacts on the bird populations within the proposed WHS are considered in **Appendix 7.7: World Heritage Site Assessment.**
RSPB Scotland 12th April 2024	Noted that RSPB Scotland objected to Strathy Wood Wind Farm due to impacts on red-throated diver in relation to barrier effects, impacts on hen harrier in relation to collision risk and disturbance and cumulative impacts on both species.	This has been noted. Although the focus of this EIA Report is the Proposed Development, which is a separate development to Strathy Wood Wind Farm, cumulative effects on IOFs, including red-throated diver and hen harrier, are considered in Section 8.12.
	Noted that the Proposed Development passes through the Caithness and Sutherland Peatlands SPA and Ramsar site and the West Halladale SSSI, and advised that, due to Likely Significant Effects (LSEs) on European sites, the EIA Report must include sufficient information to inform an Appropriate Assessment (AA). Further noted that the Proposed Development has the potential to impact on a number of qualifying features of the designated sites and potential adverse impacts associated with construction and operation of OHLs are collision,	A shadow HRA, including an AA, for Caithness and Sutherland Peatlands SPA is presented in **Appendix 8.4**. Potential impacts, including all of those listed, on all qualifying/notified features of the designated sites are considered in Section 8.10.

Organisation & Date	Summary of Consultation Response	EIA/Design Response to Consultee
	electrocution, displacement, habitat loss, barrier effects and disturbance.	
	Noted that there are additional species of conservation concern, including curlew (*Numenius arquata*), lapwing (*Vanellus vanellus*), snipe (*Gallinago gallinago*) and white-tailed eagle which are present in the area and could be affected by the Proposed Development.	Potential effects of the Proposed Development on all of these species were considered as part of the OIA. No lapwing breeding territories or flights were recorded during surveys and there were very low levels of curlew activity, with no breeding territories within 500 m. These species were therefore scoped out of the detailed assessment (see **Table 8.7**). Although low numbers of breeding snipe and low levels of flight activity were recorded, the potential for adverse effects on the NHZ 5 snipe population (2,673 pairs; Wilson *et al*., 2015) were considered to be negligible and this species was also scoped out of the detailed assessment (see **Table 8.7**). However, white-tailed eagle was identified as an IOF and a detailed assessment of potential effects of the Proposed Development on this species was completed, as presented in Section 8.10.
	Voiced their disagreement that the current surveys are sufficient for determining impact for the following reasons: • Most of the ornithological surveys were carried out between October 2018 and August 2019 and are now out of date. Although these surveys can be used for context in the EIA Report, as well as the information from other developments, they cannot be used to inform the development itself. • RSPB disagreed that surveys were sufficient at the time of previous scoping in 2020 due to insufficient survey effort, insufficient hen harrier surveys and inadequate diver and common scoter surveys. Advised that justification was required if only using these data. • The only surveys within date are the 2022 scarce breeding bird surveys and, although their inclusion is welcomed, these surveys are insufficient in scope as they do not cover the one full year recommended by NatureScot guidance, nor do they cover full breeding seasons for many of the SPA species.	While the concerns around data validity are acknowledged, it is considered that it is acceptable to use datasets spanning a period of several years to build up an accurate picture of bird use in the area. As well as the surveys completed for the Proposed Development in 2018-19, a scarce breeding bird survey was completed in 2022. Additionally, survey areas for the neighbouring Strathy North Wind Farm, for which data are available up to and including 2021, encompass the Proposed Development. Data from nearby developments (2018-19 data from the (at the time) proposed Strathy Wood Wind Farm and 2022 flight activity data from the proposed Strathy South Wind Far 'Northern Section' Grid Connection) were also reviewed as part of the desk study. As such, the survey data drawn upon are considered to be sufficient to inform a robust OIA.
	Recommended undertaking two years of field surveys, or a minimum of one further	As noted above, the existing datasets are considered sufficient to inform a robust

Organisation & Date	Summary of Consultation Response	EIA/Design Response to Consultee
	year of field survey (vantage point and breeding bird) for all of the Caithness and Sutherland Peatlands SPA qualifying features. Further suggested the inclusion of wintering bird surveys as, although the SPA is not designated for any wintering populations, including these surveys is best practice and the site may be important for wintering species such as hen harrier and may be on commuting routes for goose and swan species.	OIA. It is considered unlikely that further surveys would yield any novel information that has not already been considered, or change the outcome of the OIA.
	In addition to SPA species, RSPB noted that they have records of white-tailed eagle and curlew in the vicinity of the Proposed Development, and these "should be included in any surveys".	Data was obtained from the RSPB as part of the desk study. There were no records of breeding curlew (or any other Schedule 1 or Red-listed breeding species) within 2 km of the Proposed Development nor any breeding or roosting white-tailed eagle records within 6 km. Both curlew and white-tailed eagle were considered to be target species during field surveys for the Proposed Development and neighbouring developments (reviewed as part of the desk study).
	Advised that surveys should allow for analysis of adverse impacts associated with both construction and operation of OHLs, including collision, displacement, habitat loss and disturbance in order to provide up-to-date information on bird distribution and activity to assess likely effects and inform any required mitigation and compensation.	As noted above, the existing datasets are considered sufficient to inform a robust OIA and all of these potential impacts have been considered (see Section 8.10). Targeted mitigation is detailed in Section 8.11.
	Recommended that the following information is provided within the EIA Report: • Full information on the flight activity surveys, including dates, times and weather conditions; • Maps of VP locations that also denote viewsheds and all components of the Proposed Development; • Maps of bird survey areas; and • Maps of common scoter, wader, diver and raptor breeding, foraging and roosting areas, and commuting routes.	Details of the surveys are included in **Appendix 8.1** and survey areas and key results are included on the relevant Figures within Volume 2 of this EIA Report, with additional confidential results Figures included within **Appendix 8.2: Ornithology Confidential Annex** and **Appendix 8.3: Strathy North Wind Farm Ornithology Summary Report (Confidential)** within Volume 4 of this EIA Report.
	Further noted that it is extremely important that surveys cover all elements of the Proposed Development.	Details of the survey areas are included in **Appendix 8.1** and shown on the relevant Figures (listed above) within Volume 2 of this EIA Report.
	Stated that the developments identified in the Scoping Report for consideration in the cumulative impacts assessment are	Details of the developments included in the assessment of cumulative effects are included in Section 8.13.

Organisation & Date	Summary of Consultation Response	EIA/Design Response to Consultee
	insufficient in scope as they do not include all developments at the appropriate level. Advised that, as an example, the assessment should include the Strathy North Grid Connection, any 33 kV and 11 kV distribution network infrastructure, particularly in relation to collision risk to diver species, common scoter and hen harrier, noting that common scoter are likely to fly at night.	Developments included in the assessment are considered to be proportionate to the scale of the Proposed Development.
	Highlighted their increasing concern about cumulative effects on birds due to the high number of operational, consented and planned wind farm developments across the Flow Country and their associated infrastructure. Advised that, due to the LSE of this development on the SPA, impacts should be assessed for the SPA populations as well as at the NHZ level. Further advised that a robust cumulative assessment of collision risk, disturbance, displacement and barrier effects should take account all operational, consented and proposed wind energy schemes and their associated infrastructure that could impact on bird populations of both the relevant NHZ and the Caithness and Sutherland Peatlands SPA.	Potential cumulative effects on IOFs are discussed in Section 8.13. Where a potential cumulative effect was identified, this was assessed against the Caithness and Sutherland Peatlands SPA population, as this was considered to be the most appropriate scale for the relevant IOFs; as the NHZ populations are larger than the SPA, and hence potential effects would affect a smaller proportion of the NHZ population compared with the SPA population, this is considered to be a suitable approach. Developments included in the assessment are considered to be proportionate to the scale of the Proposed Development.
	Advised that the cumulative disturbance and displacement impact on birds from the increase in traffic and noise from the additional use of existing wind farm access tracks during construction and maintenance of the Proposed Development should also be included and any identified impacts should be assessed against the relevant SPAs and NHZ population.	Potential cumulative effects on IOFs are considered in Section 8.13. While it is acknowledged that additional use of existing wind farm tracks could increase existing levels of disturbance, particularly during construction of the Proposed Development, this would be temporary, and it is likely that birds present in the area would be habituated to relatively high levels of background disturbance.
	Advised that the in-combination effect of other relevant plans or projects within the wider NHZ 5 area, such as the Sutherland Spaceport and OHL grid connections at Limekiln and Creag Riabhach should also be considered.	Details of the developments included in the assessment of cumulative effects are included in Section 8.13. Developments included in the assessment are considered to be proportionate to the scale of the Proposed Development.
	Advised that the EIA Report should fully discuss mitigation measures to reduce impacts of displacement, disturbance, and direct mortality on qualifying SPA species and birds of conservation concern, during both construction and ongoing future maintenance and that evidence should be provided for the assumed effectiveness of	Targeted mitigation is detailed in Section 8.11.

Organisation & Date	Summary of Consultation Response	EIA/Design Response to Consultee
	proposed mitigation measures based on experience from other projects.	
	Advised that flight activity data from flight activity surveys should be used in conjunction with NatureScot guidance on power line developments to minimise impacts on birds through design. Undergrounding/ horizontal directional drilling should be considered where there is potential for bird collision risk and line marking as an alternative.	NatureScot (2016a) guidance on power lines was consulted to inform the OIA and relevant mitigation. Details of mitigation by design and embedded mitigation are provided in Section 8.9, while details of targeted mitigation (including the use of line markers) are provided in Section 8.11.
The Highland Council 27th June 2024	Stated that the presence of Schedule 1 birds and qualifying features of SPAs and other areas designated for avian interests must be included and considered as part of the planning application process, not as an issue that can be considered at a later stage, and that any consent given without due consideration to these species may breach European Directives with the possibility of consequential delays or the project being halted by the European Commission (EC). Advised that reference should be made to any comments from NatureScot and THC's Ecology Officer in this respect.	Potential impacts of the Proposed Development on all IOFs, including Schedule 1 of the W&CA and qualifying features of the Caithness and Sutherland Peatlands SPA, are discussed in Sections 8.10 and 8.13 of this Chapter. Additionally, a shadow HRA for Caithness and Sutherland Peatlands SPA is presented in **Appendix 8.4**. As summarised in this Table, all comments from relevant consultees, including NatureScot, have been taken into account when completing the OIA.
	Advised that an assessment of the impacts to birds through collision, disturbance, electrocution and displacement from foraging / breeding / roosting habitat will be required for both the Proposed Development and cumulatively with other developments,	Potential impacts affecting IOFs, including collision, disturbance, electrocution and displacement have been considered, both for the Proposed Development in isolation and cumulatively with other developments in the surrounding area (see Sections 8.10 and 8.13 of this Chapter respectively).
	Stated that ornithology survey methods should be clearly detailed in the EIA Report and should include any deviations from relevant guidance.	Ornithology survey methods are summarised in Section 8.7 of this Chapter, with full details presented in **Appendix 8.1**, including details of survey limitations/deviations from relevant guidance.
	Disagreed with the proposal to scope out potential impacts of the Proposed Development on the North Caithness Cliffs SPA and the North Sutherland Coastal Islands SPA, unless NatureScot confirm that these can be scoped out.	NatureScot confirmed (via email dated 30th July 2024) that it was acceptable to scope out potential effects of the Proposed Development on both SPAs.
	Stated that the EIA Report should provide a baseline survey of the bird interest within the Proposed Development footprint.	Baseline surveys completed for the Proposed Development are summarised in Section 8.7, with a summary of results included in Section 8.8. Further details are presented in **Appendix 8.1**.

Organisation & Date	Summary of Consultation Response	EIA/Design Response to Consultee
	Advised that the HMP should include a comprehensive monitoring programme for breeding birds.	The success of the HMP measures would be monitored and reviewed at regular intervals throughout the lifetime of the Proposed Development, as outlined in Section 8.11 of this Chapter.

8.5 Effects Scoped Out of the Assessment

8.5.1 Although decommissioning may cause disturbance to breeding, foraging and/or roosting birds, the magnitude of effect would depend on the bird species assemblage present at the time and cannot be reliably predicted at this stage. Therefore, potential effects on ornithological features during the decommissioning phase of the Proposed Development are not assessed. However, as decommissioning activities are generally of a similar nature to construction activities, it is considered that the potential effects of decommissioning would be comparable to the potential effects of construction, with the exception that habitat would likely be restored, and birds would be able to return to abandoned territories.

8.5.2 All IOFs identified as being of Local or lower importance in Section 8.10 were scoped out of the OIA.

8.5.3 Due to the designs used for the steel lattice towers, which have phase conductors which are at least 3.8 m apart, and the two trident 'H' wood poles, which have a minimum separation distance of 2.1 m between live elements, the risk of a significant number of mortality events is considered to be negligible and potential mortality/injury due to electrocution has been scoped out of the OIA.

8.6 Legislation, Policy and Guidance

8.6.1 The key legislation, policy and guidance listed below has been considered when undertaking the OIA.

European Legislation, Policy and Guidance

- Directive 2009/147/EC on the Conservation of Wild Birds ('the Birds Directive') (European Parliament, 2009).
- Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (the Habitats Directive) (European Parliament, 1992).
- Environmental Impact Assessment Directive 2014/52/EU (European Parliament, 2014).

National Legislation, Policy and Guidance

- The Wildlife & Countryside Act 1981 (UK Government, 1981).
- The Conservation (Natural Habitats &c) Regulations 1994 (as amended) ('the Habitats Regulations'). (UK Government, 1994).
- The Nature Conservation (Scotland) Act 2004 (as amended) (UK Government, 2004).
- The Conservation of Habitats and Species Regulations 2017, relating to reserved matters in Scotland. (UK Government, 2017).
- Planning Advice Note 1/2013: Environmental Impact Assessment (Scottish Government 2013).
- Electricity Works (Environment Impact Assessment) (Scotland) Regulations 2017 (Scottish Government, 2017).
- Planning Advice Note 60: Planning for Natural Heritage (Scottish Government, 2020).
- National Planning Framework 4 (NPF4) (Scottish Government, 2023).

Other Guidance

- Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms. Version 2. (NatureScot, 2017).
- Bird Monitoring Methods. (Gilbert et al., 1998).
- Raptors: a field guide to survey and monitoring, 3rd edition (Hardey et al., 2013).
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management (CIEEM). (2018).
- Environmental Impact Assessment Handbook (NatureScot, 2018a).
- Guidance - Assessment and mitigation of impacts of power lines and guyed meteorological masts on birds. (NatureScot, 2016a).
- Assessing connectivity with Special Protection Areas (SPAs), version 3. (NatureScot, 2016b).
- Assessing the cumulative impacts of onshore wind farms on birds (NatureScot, 2018c).
- Environmental Statements and Annexes of Environmentally Sensitive Bird Information. Guidance for Developers, Consultants and Consultees. (NatureScot, 2016c).
- Dealing with construction and birds (NatureScot, 2016d).
- Disturbance Distances in selected Scottish Bird Species (NatureScot, 2022),

8.7 Methodology

8.7.1 Ornithology field surveys of the Proposed Development were carried out between October 2018 and August 2019, and between May and July 2022. Additionally, a desk study was completed to supplement the field survey results. Further details are provided below.

Desk Study

8.7.2 A comprehensive desk study of published data was undertaken between April and June 2024. As part of the desk study, designated sites of ornithological importance within the study area were identified. Additionally, existing datasets from surrounding developments for which the survey areas overlapped the study area, namely the operational Strathy North Wind Farm, the consented Strathy Wood Wind Farm[2] and the proposed Strathy South Wind Farm' Northern Section' Grid Connection[1], were reviewed. Records of protected and sensitive species were also obtained from the RSPB and Highland Raptor Study Group (HRSG).

8.7.3 Full details of the desk study methods are presented in **Appendix 8.1** within Volume 4 of this EIA Report.

Field Surveys

8.7.4 Ornithology field surveys of the Proposed Development were carried out by Stagfire Ecological Surveys Ltd and WSP between October 2018 and August 2019, comprising the following:

- Flight activity surveys (October 2018 to August 2019 inclusive);
- Black grouse (*Lyrurus tetrix*) lek survey (April to May 2019);
- Moorland breeding bird survey (April to July 2019); and
- Scarce breeding bird survey (April to July 2019) which included breeding diver surveys.

8.7.5 The 2018-19 ornithology survey areas, which are shown on **Figure 8.2a**, Volume 2 of this EIA Report, were based on the optimal route option at that time (which was similar to the optimal route option of the Proposed Development), with survey-specific buffers (500 m for the moorland breeding bird survey, 1.5 km for the black grouse survey, and 2 km for the scarce breeding bird survey).

[2] Note that the 2019 data are not publicly available.

8.7.6 Additionally, a scarce breeding bird survey for the Proposed Development was completed by Blairbeg Consulting Ltd between May and July 2022. The survey area, which is shown in **Figure 8.2b** within Volume 2 of this EIA Report, was based on the optimal route option of the Proposed Development at that time (which differed from that on which the 2018-2019 surveys were based) and a surrounding 500 m buffer.

8.7.7 Details of the survey methods are presented in **Appendix 8.1** within Volume 4 of this EIA Report.

Assessment of Effects

8.7.8 The approach used for the OIA is in line with guidance produced by CIEEM (2018) and NatureScot (2018a), and comprises the following stages:

- An evaluation of the importance of ornithological features identified through the field surveys and desk study. Those considered to be 'Important Ornithological Features' (IOFs) are scoped into the assessment, while species considered to be of local or lower importance are scoped out;
- Identification and characterisation of potential effects on IOFs;
- Assessment of potential effects on IOFs, both from the Proposed Development alone and in combination with other developments in the surrounding area (cumulative effects);
- Identification of any measures required to avoid and mitigate (reduce) these effects; and
- Assessment of the significance of any residual effects after mitigation.

8.7.9 Further details relating to the methods used for evaluating the importance of ornithological features, characterising the magnitude of potential effects, and assessing significance are provided below.

Sensitivity/Importance of Ornithological Features

8.7.10 In accordance with CIEEM (2018) guidance, the level of importance of each ornithological feature identified during the field surveys and/or desk study has been determined within a geographic context as being of International, National, Regional, Local or Less than Local importance.

8.7.11 Features evaluated as being of Regional or higher importance are considered to be IOFs, while those of Local or lower importance are not considered to be IOFs and are scoped out of the assessment.

8.7.12 For sites, the level of importance is evaluated through a consideration of statutory designations and relevant legislation, as well as potential connectivity to the study area. A statutory site may be of international importance, but if there is no pathway for effects from the Proposed Development, e.g., no demonstrated or likely movement of features between the respective areas or no hydrological connectivity, it is not considered to be an IOF.

8.7.13 For bird species, the level of importance is evaluated through a consideration of relevant legislation, conservation status, population size and distribution and whether they are a designated feature of a statutory site (with potential connectivity to the study area), as well as NatureScot (2016a) guidance on selecting target species for assessment when considering the impacts of power lines.

8.7.14 Additionally, the number of individuals using the study area, and the nature and level of use, are considered. For example, if one or more pairs of a species listed on Schedule 1 of the W&CA was found to be breeding within the study area, the species would likely be of regional or higher importance (depending on whether or not it is a designated feature of a statutory site, as well as population status and trends). In contrast, if a Schedule 1-listed bird flew across the ornithology study area very occasionally, and the species was not considered to be using it regularly for breeding, roosting or foraging, it would not be identified as an IOF.

8.7.15 Note that, in some cases, information relating to the size and/or distribution of local and regional bird populations can be limited or unavailable. Where this is the case and it is not clear whether a population is

locally versus regionally (or regionally versus nationally) important, a precautionary approach is used, and the population is assessed as being of the higher level of importance.

Potential Effects

8.7.16 The main ways in which an OHL could affect IOFs during the construction phase are via:

- Habitat loss and degradation due to construction of the Proposed Development and associated infrastructure, including new access tracks; and
- Disturbance/displacement resulting from the presence of personnel and presence/use of vehicles and machinery during construction of the Proposed Development.

8.7.17 The main ways in which an OHL could affect IOFs during the operational phase are via:

- Disturbance/displacement of breeding, roosting and/or foraging resulting from the presence of personnel, and presence/use of vehicles and machinery during operational maintenance of the Proposed Development.
- Mortality/injury due to birds colliding with the OHL, or electrocution if attempting to perch or nest on it.
- Barrier effects due to the Proposed Development presenting a barrier, either alone or cumulatively with other developments, to the movement of birds, restricting or displacing birds from much larger areas.

Magnitude of Effects

8.7.18 Magnitude refers to the size, amount, intensity and volume of an impact, determined on a quantitative basis if possible, but typically expressed in terms of relative severity, such as high, medium, low, or negligible. Extent, duration, reversibility, timing, and frequency of the impact can be assessed separately but they tie in to determine the overall magnitude.

8.7.19 The following criteria were used to assess the magnitude of potential effects from the Proposed Development, both alone and in combination with other developments in the surrounding area (cumulative effects):

- High: an impact that could cause a fundamental change to the baseline condition of the IOF, leading to total loss or major alteration of the relevant population in the short to long-term, affecting the long-term viability.
- Medium: an impact that could cause a material change to the baseline condition of the IOF, leading to partial loss or alteration of the relevant population in the short to medium term, but which should not alter the long-term viability of the site/population.
- Low: an impact of small scale or short duration that could cause a slight, detectable, alteration of the baseline condition of the IOF, resulting in no long-term harm to the habitat/populations viability.
- Negligible: an impact causing no, or a barely distinguishable, change from baseline conditions

Significance of Effect

8.7.20 The overall significance of effect is defined using a combination of impact magnitude and sensitivity/importance of IOFs.

8.7.21 CIEEM (2018) guidance avoids and discourages use of the matrix approach to determine significance and describes only two categories: "significant" or "not significant". According to this guidance, for the purpose of Ecological Impact Assessment (EcIA), a "significant effect" is an effect that either supports or undermines biodiversity conservation objectives for important ecological features (which in this case would be IOFs) or for biodiversity in general.

8.7.22 NatureScot (2018b) guidance on assessing the significance of wind farm impacts on birds refers to maintaining the favourable conservation status of bird species, or where a species is already in decline, not affecting its

recovery. Although this guidance relates to onshore wind farms, the advice regarding conservation status is considered to be applicable to other types of development, including grid connections.

8.7.23 Where potential connectivity with an SPA has been identified, significant effects on species are assessed in the context of potential effects on the conservation status of the SPA population (and the potential for LSEs on qualifying features of the SPA is considered in **Appendix 8.4**). In the case of species that are not designated features of an SPA with potential connectivity to the Proposed Development, the relevant scale for assessment of significant effects on conservation status of populations is considered to be NHZ 5 (the Peatlands of Caithness and Sutherland), within which the Proposed Development is located.

8.7.24 For some species that are not designated features of statutory sites, there is limited information on NHZ populations; in this situation effects on the conservation status of the regional or Scottish (national) population (depending on what data are available) have been considered when determining whether potential effects are likely to be significant.

8.7.25 For the purposes of this assessment, any effect that could threaten the integrity of a statutory site designated for ornithological features, or the favourable conservation status of a population, is considered to be significant. Where this is not the case, effects are considered to be not significant.

Limitations to the Assessment

8.7.26 It is assumed that field surveys for the Proposed Development, which were managed by WSP and Blairbeg Consulting Ltd, were completed in line with relevant guidance and that data received from them, including the results of breeding bird territory analysis, were correct at the time of provision.

8.7.27 The 2019 scarce breeding bird data provided by WSP for the Proposed Development indicated that a small number of additional wader territories may have been present in the wider area around the Proposed Development (between 0.5-2 km away) but were not included in the territory analysis completed by WSP.

8.7.28 Similarly, there were incidental records of teal (*Anas crecca*) and wader species during the 2018 and 2019 breeding season flight activity surveys at Strathy Wood Wind Farm, some of which were indicative of breeding. Teal was not included in the territory analysis completed by Atmos; it is not known whether the incidental wader records were used to inform the analysis.

8.7.29 It is assumed that records received from third party organisations (RSPB) were correct at the time of provision.

8.7.30 Assessment of cumulative effects was reliant on the availability and accuracy of information pertaining to other developments.

8.7.31 Additionally, as different projects sometimes employ different baseline survey and/or impact assessment methods, datasets often cannot be directly compared. Furthermore, confidential data and assessments are not publicly available, and as there is no compulsion for developers to share commercial data with other companies, it is often impossible to acquire a full dataset. Therefore, a comprehensive and quantitative cumulative impact assessment is rarely possible. However, every effort has been made to provide an assessment that is as robust as the available data allows.

8.7.32 There are no defined modelling methods for predicting the risk of birds colliding with OHLs. Given that the Proposed Development overlaps the Caithness and Sutherland Peatlands SPA and Ramsar site, and in line with current NatureScot (2016a) guidance, emphasis is therefore placed on installation of line markers as targeted mitigation to reduce potential collision risk to IOFs.

8.8 Baseline Conditions

Designations

8.8.1 The Proposed Development overlaps with the Caithness and Sutherland Peatlands SPA and Ramsar site, which is designated for a range of breeding duck, wader, diver and raptor species, as well as the West Halladale SSSI, which is a component of the SPA. The SSSI is designated for breeding common scoter, breeding black-throated diver and its breeding bird assemblage (as well as blanket bog).

8.8.2 Three additional SPAs, one of which is also a Ramsar site, and one additional SSSI are also located within the study area:

- Lochan Buidhe Mires SSSI, which is designated for its breeding bird assemblage (as well as blanket bog) and is also a component of the Caithness and Sutherland Peatlands SPA, is located approximately 1.9 km to the west of the Proposed Development;
- North Caithness Cliffs SPA, which is designated for breeding peregrine and several breeding seabird species, as well as its breeding seabird assemblage feature, is located approximately 7.2 km to the northeast;
- North Sutherland Coastal Islands SPA, which is designated for non-breeding barnacle goose (*Branta leucopsis*), is located approximately 18.8 km to the northwest; and
- Caithness Lochs SPA and Ramsar site, which is designated for non-breeding greylag goose, Greenland white-fronted goose (*Anser albifrons flavirostris*) and whooper swan, is located approximately 19.8 km to the east.

8.8.3 Further details of these sites are presented in **Appendix 8.1** and locations are shown in **Figure 8.3**, Volume 2 of the EIA Report.

8.8.4 It is also noted that the Proposed Development is located within the Flow Country WHS; an assessment of potential effects of the Proposed Development on this designated site, including IOFs, is presented in **Appendix 7.7** and it is not considered further in this Chapter.

8.8.5 Additionally, the Forsinard Flows RSPB nature reserve, which overlaps the Caithness and Sutherland Peatlands SPA, is located approximately 3.0 km to the south of the Proposed Development (at the closest point).

Desk Study

Review of Strathy North Wind Farm Data

8.8.6 During the 2016-19 and 2021 flight activity surveys at the operational Strathy North Wind Farm, a total of 426 flights by 25 identified target species were recorded, along with a further three flights by unidentified species (geese and divers). The total number of flights per year was as follows:

- 2016: 85 flights by 18 identified target species;
- 2017: 65 flights by 10 identified target species;
- 2018: 88 flights by 13 identified target species;
- 2019: 101 flights by 14 identified target species and a further three flights by unidentified (goose and diver) species; and
- 2021: 87 flights by 13 identified target species.

8.8.7 Overall, levels of annual flight activity were generally low, with five or fewer flights per year recorded for most target species. An annual summary is presented in **Table 8.2**. Further details are included in **Appendices 8.2 and 8.3**.

8.8.8 Flight lines of key target species recorded during the 2016-19 surveys are included in the Figures within **Appendix 8.3**; target species recorded during the 2021 surveys are shown in **Figures 8.4a to 8.4c**, Volume 2 of this EIA Report.

Table 8.2: Summary of Target Species Flights Recorded during Annual Operational Monitoring at Strathy North Wind Farm in 2016-19 and 2021

Target Species	Total No. of Flights (and No. of Birds per Flight)					
	2016	2017	2018	2019	2021	Total
Greylag goose	12 (2-9)	2 (2-3)	13 (1-89)	4 (1-7)	6 (2-8)	**37 (1-89)**
Pink-footed goose	-	-	-	-	2 (27-130)	**11 (1-130)**
Whooper swan	-	-	1 (12)	-	-	1 (12)
Mallard (*Anas platyrhynchos*)	8 (1-9)	1 (1)	5 (1-2)	2 (1-4)	2 (2-3)	**18 (1-9)**
Teal	3 (2-14)	-	1 (3)	2 (1-2)	1 (2)	**7 (1-14)**
Oystercatcher (*Haematopus ostralegus*)	-	-	-	1 (9)	-	**1 (9)**
Golden plover	3 (1-7)	1 (1)	-	1 (1)	-	**5 (1-7)**
Curlew	1 (1)	-	-	3 (1)	1 (1)	**5 (1)**
Dunlin (*Calidris alpina*)	1 (2)	1 (2)	-	2 (1)	3 (1)	**7 (1-2)**
Snipe	-	4 (1-5)	13 (1)	8 (1-2)	12 (1)	**51 (1-5)**
Greenshank	28 (1-2)	33 (1-2)	12 (1)	11 (1-2)	27 (1-2)	**111 (1-2)**
Great skua (*Stercorarius skua*)	-	1 (1)	-	-	-	**1 (1)**
Red-throated diver	9 (1-3)	-	1 (1)	4 (1-2)	6 (1-2)	**20 (1-3)**
Black-throated diver	1 (1)	-	-	-	1 (1)	**2 (1)**
Grey heron (*Ardea cinerea*)	1 (1)	-	-	-	-	**1 (1)**
Osprey	1 (1)	2 (1)	-	-	3 (1)	**6 (1)**
Golden eagle (*Aquila chrysaetos*)	4 (1)	-	-	1 (2)	-	**5 (1-2)**
Hen harrier	4 (1)	5 (1)	29 (1)	54 (1-2)	7 (1)	**99 (1-2)**
Red kite (*Milvus milvus*)	-	-	1 (1)	-	-	**1 (1)**
White-tailed eagle	1 (1)	-	2 (1)	1 (1)	6 (1)	**10 (1)**
Short-eared owl (*Asio flammeus*)	-	-	1 (1)	-	-	**1 (1)**
Kestrel (*Falco tinnunculus*)	1 (1)	-	-	-	-	**1 (1)**
Merlin	5 (1)	1 (1)	2 (1)	4 (1)	10 (1)	**22 (1)**
Hobby (*Falco subbuteo*)	-	-	-	2 (1)	-	**2 (1)**
Peregrine	1 (1)	-	-	-	-	**1 (1)**
Unidentified goose species (likely greylag)	-	-	-	1 (12)	-	**1 (12)**

Target Species	Total No. of Flights (and No. of Birds per Flight)					
	2016	2017	2018	2019	2021	Total
Unidentified goose species (likely pink-footed)	-	-	-	1 (8)	-	**1 (8)**
Unidentified diver species (likely red-throated)	-	-	-	1 (1)	-	**1 (1)**
Total	**85**	**65**	**88**	**104**	**87**	**429**

8.8.9 Levels of flight activity by other species listed on Schedule 1 of the W&CA and/or Annex I of the Birds Directive, recorded during breeding raptor and/or diver surveys were low (four or fewer flights per year).

8.8.10 Numbers of breeding territories of non-passerine species recorded during each operational monitoring year at Strathy North Wind Farm are summarised in **Table 8.3**. Further details are included in **Appendices 8.2 and 8.3** within Volume 4 of this EIA Report.

8.8.11 Breeding territories of key target species recorded during the 2016-19 surveys are included in the Figures within **Appendix 8.3**. With the exception of species listed on Schedule 1 of the W&CA, details of which are included in **Appendix 8.2**, territories of non-passerine species recorded during the 2021 surveys are shown on **Figures 8.4a to 8.4c**, within Volume 2 of this EIA Report.

Table 8.3: Summary of Non-passerine Breeding Territories Identified during Annual Operational Monitoring at Strathy North Wind Farm in 2016-19 and 2021

Species	No. of Breeding Territories				
	2016	2017	2018	2019	2021
Teal	-	-	-	-	4
Red grouse (*Lagopus lagopus*)	8	2	2	-	12
Cuckoo (*Cuculus canorus*)	2	1	-	2	2
Little grebe (*Tachybaptus ruficollis*)	5	-	-	-	1
Golden plover	2	3	4	3	10
Ringed plover (*Charadrius hiaticula*)	1	-	-	1	-
Curlew	-	1	-	-	-
Dunlin	1	1	4	2	3
Snipe	4	4	-	-	5
Common sandpiper (*Actitis hypoleucos*)	3	2	1	2	3
Greenshank	7	7	4	6	10
Red-throated diver	1	1	1	1	3
Black-throated diver	1	1	1	1	2
Sparrowhawk (*Accipiter nisus*)	1	-	-	-	-
Hen harrier	-	1	2	1	-
Merlin	1	1	1	2	-

8.8.12 In addition to the 2016-19 and 2021 data from Strathy North Wind Farm, there were incidental records of an osprey nest and roosting white-tailed eagle during Ecological Clerk of Works (ECoW) pre-felling checks at Strathy North Wind Farm in 2023. Details of the locations are provided in **Appendix 8.2.**

Review of Strathy Wood Wind Farm Data[2]

8.8.13 A total of 118 flights by eight target species were recorded during the 2018 and 2019 breeding season flight activity surveys for the consented Strathy Wood Wind Farm. The total numbers of flights per year were as follows:

- 2018: 78 flights by eight target species; and
- 2019: 40 flights by six target species.

8.8.14 Overall, levels of annual flight activity were generally low, with up to 17 flights of each target species recorded per breeding season. Numbers of birds per flight were also low (five or fewer birds, with the exception of single flights of seven golden plover and 11 greylag geese). A summary is presented in **Table 8.24**. Further details of the 2018 flights are available in Atmos (2019).

Table 8.4: Summary of Target Species Flights Recorded during Baseline Surveys for Strathy Wood Wind Farm during 2018 and 2019 Breeding Season Flight Activity Surveys

Species	Total no. of Flights (and No. of Birds per Flight)		
	2018	2019	Total
Greylag goose	5 (2-11)	3 (2)	**8 (2-11)**
Teal	5 (1-2)	3 (2)	**8 (1-2)**
Golden plover	12 (1-4)	3 (1-7)	**15 (1-7)**
Dunlin	15 (1-3)	-	**15 (1-3)**
Snipe	1 (1)	-	**1 (1)**
Greenshank	14 (1-2)	11 (1-2)	**25 (1-2)**
Red-throated diver	9 (1-2)	9 (1-2)	**18 (1-2)**
Hen harrier	17 (1)	11 (1)	**28 (1)**
Total	**78**	**40**	**118**

8.8.15 Numbers of wildfowl, wader, diver and raptor breeding territories identified during the 2018 and 2019 breeding season surveys for Strathy Wood Wind Farm are summarised in **Table 8.5**. Further details of the 2018 territories are available in Atmos (2019) and locations of Schedule 1 breeding territories are included in **Appendix 8.3**.

Table 8.5: Summary of Wildfowl, Wader, Diver and Raptor Breeding Territories Identified during 2018 and 2019 Breeding Season Surveys for Strathy Wood Wind Farm

Species	No. of Breeding Territories	
	2018	2019
Teal	1 (confirmed)*	1 (confirmed)*
Golden plover	7 (1 probable; 6 possible)	1 (possible)
Dunlin	4 (1 probable; 3 possible)	-
Common sandpiper	-	1 (possible)

Species	No. of Breeding Territories	
	2018	2019
Greenshank	6 (1 confirmed; 1 probable; 4 possible)	2 (1 confirmed; 1 possible)
Red-throated diver	1 (confirmed)	1 (confirmed)
Sparrowhawk	-	1 (possible)
Hen harrier	1 (confirmed)	2 (1 confirmed; 1 possible)
Buzzard (*Buteo buteo*)	-	1 (probable)
*Based on incidental records during flight activity surveys; no territory analysis was completed		

Review of Strathy South Wind Farm 'Northern Section' Grid Connection Data[1]

8.8.16 A total of six flights by five target species were recorded from VPs 1 and 2 during the 2022 flight activity surveys: two herring gull (*Larus argentatus*) flights and single flights by black-headed gull (*Chroicocephalus ridibundus*), great black-backed gull (*Larus marinus*), osprey and hen harrier. All flights were of 1-2 birds. Flight lines are shown on **Figure 8.4d** within Volume 2 of this EIA Report.

Data Requests

8.8.17 The RSPB provided a total of 122 records of 40 bird species, including six passerine species (which are not generally considered to be of concern in relation to potential impacts from power lines; NatureScot, 2016a) and buzzard (which is not considered to be of conservation concern).

8.8.18 The majority of the records were supplied as a single Geographic Information System (GIS) polygon corresponding with the Forsinard Flows RSPB nature reserve, located approximately 3 km from the Proposed Development (at the closest point). The remaining records, for which locational data was available for individual records, were all more than 2 km from the Proposed Development, with no records of breeding or roosting eagle species within 6 km of the Proposed Development. Further details are presented in **Appendix 8.2** within Volume 4 of this EIA Report.

8.8.19 The HRSG returned records of a golden eagle territory (with multiple nest sites) and a single registration of an osprey pair. All nest sites within the golden eagle territory were more than 2 km from the Proposed Development, while the osprey pair coincided with the incidental record of an osprey nest recorded at Strathy North Wind Farm in 2023 (as described in paragraph 8.8.12). Details of the locations are presented in **Appendix 8.2**.

Field Surveys

8.8.20 Key results from the field surveys are summarised below. Further details are presented in **Appendices 8.1** and **8.2** within Volume 4 of this EIA Report.

2018-19 Surveys

8.8.21 A total of 59 flights by nine target species were recorded during the 2018-19 flight activity surveys, the majority during the breeding season. Hen harrier was the species recorded most frequently (46 flights). There were four flights of pink-footed goose and 1-2 flights of the remaining seven species, namely, red grouse, snipe, greenshank, black-throated diver, golden eagle, merlin and peregrine. With the exception of pink-footed goose, which was recorded in flocks of 18-220 birds, all flights were of 1-2 birds.

8.8.22 Target species flights recorded during the non-breeding season are shown in **Figure 8.5a** within Volume 2 of this EIA Report. With the exception of hen harrier flights, which are included in **Appendix 8.2** (within Volume 4), flights of target species recorded during the breeding season are shown in **Figure 8.5b** within Volume 2.

8.8.23 No black grouse were recorded during the 2019 lek surveys or observed during any other 2018-19 surveys.

8.8.24 Five breeding territories of three wader species, namely snipe (two territories), common sandpiper (two territories) and greenshank (one territory), were recorded during the 2019 moorland breeding bird survey. The snipe and common sandpiper territories are shown in **Figure 8.5c** within Volume 2 of this EIA Report; details of the greenshank territory are included in **Appendix 8.2** (within Volume 4).

8.8.25 Single territories of four breeding species listed on Schedule 1 of the W&CA were recorded within the study area during the 2019 scarce breeding bird survey, namely greenshank, black-throated diver, hen harrier and merlin.

2022 Scarce Breeding Bird Survey

8.8.26 During the 2022 scarce breeding bird survey, five breeding territories of four wader species, namely oystercatcher (one possible territory), golden plover (one territory), snipe (two territories) and common sandpiper (one territory), were recorded. A single mallard territory was also recorded. The locations of these territories are shown in **Figure 8.5d** within Volume 2 of this EIA Report.

8.9 Mitigation by Design and Embedded Mitigation

8.9.1 In accordance with CIEEM (2018) guidance, a sequential process has been adopted to avoid, mitigate and compensate adverse effects on IOFs (often referred to as the 'mitigation hierarchy'). Details of mitigation by design and embedded mitigation are presented below, while further mitigation measures are detailed in Section 8.11. In addition, opportunities for enhancements that will benefit IOFs have been identified where possible and are also outlined in Section 8.11.

Mitigation by Design

8.9.2 Ornithological sensitivities were taken into account when designing the layout of the Proposed Development, with the layout designed to minimise potential effects on IOFs as far as possible. For example, the new permanent access track route was selected to minimise potential disturbance to nesting bird species.

8.9.3 In general, electrocution of birds can occur on structures where the separation distance between phase conductors, or between earthed hardware and energised phase conductors, is less than the flesh-to-flesh distance of a bird. On a horizontal plane, the flesh-to-flesh distance is considered to be the wrist-to-wrist distance of a bird's wingspan; on a horizontal plane it is considered to be the bird's length from head-to-foot.

8.9.4 The steel lattice towers have phase conductors which are at least 3.8 m apart, while the minimum separation distance between live elements on the trident 'H' wood poles is 2.1 m. These dimensions are greater than the recommended minimum separation distances in Avian Power Line Interaction Committee (APLIC) (2006) guidance for eagle species[3] are 1.5 m of horizontal separation and 1.0m of vertical separation.

Embedded Mitigation

8.9.5 The key type of embedded mitigation with relevance to ornithological features is implementation of a Bird Protection Plan (BPP) during construction of the Proposed Development to protect breeding birds and roosting Schedule 1A species (Schedule 1A to the W&CA) in accordance with relevant legislation. Proposed BPP

[3] Eagle species are the IOFs with the largest wing spans that could potentially be at risk of electrocution from the OHL.

measures are outlined below. Subsequent sections of this Chapter assume that the embedded mitigation described below will be fully implemented.

Bird Protection Plan

8.9.6 Under the W&CA, it is an offence to kill or injure any bird, or to damage or destroy nests and eggs. Breeding species listed on Schedule 1 to the Act are afforded additional protection from disturbance. In addition, golden eagle, hen harrier, red kite and white-tailed eagle are listed on Schedule 1A to the Act. Species listed in Schedule 1A to the W&CA are legally protected from harassment at all times (including during the non-breeding season).

8.9.7 Additionally, the Birds Directive provides protection against deliberate disturbance of birds, particularly during the period of breeding and chick rearing (Article 5(d)). Many species listed on Schedule 1 to the W&CA are also listed on Annex I of the Birds Directive, but certain species, such as golden plover and short-eared owl are only included on the latter. Whilst it may not be illegal to disturb a breeding species listed on Annex I of the Birds Directive that is not also included on Schedule 1 to the W&CA, to ensure delivery of the objectives of the Directive, disturbance should not adversely affect the species' conservation status (NatureScot, 2016d).

8.9.8 As such, the good practice measures outlined below would be incorporated into a detailed BPP, developed post-consent, to ensure compliance with the legislation protecting breeding birds and roosting Schedule 1A species during construction of the Proposed Development. The exact measures would be determined in consultation with NatureScot but would likely include those outlined in **Table 8.6**.

Table 8.6: Outline BPP Measures to be Implemented during Construction

Type of Measure	Description
Appointment of an ECoW	To ensure that embedded mitigation measures are reactive to changing conditions during the Proposed Development and compliant with relevant legislation protecting breeding birds and roosting Schedule 1A species, a suitably experienced ECoW would be appointed to oversee their implementation. The ECoW would regularly attend areas where works are planned throughout the construction phase of the Proposed Development, to identify any potential constraints to works and/or reactive mitigation needs, particularly if any works take place during the breeding bird season.
Appointment of a Professional Ornithologist	Although oversight of the BPP would be the responsibility of the ECoW, in order to ensure specialist technical support is available, if construction overlaps with the breeding bird season (defined as March to August inclusive) during one or more years, it is proposed that a suitably experienced and licensed ornithologist would be appointed throughout this period. The ornithologist would attend areas where works are planned on a regular basis and would have responsibility for implementing the measures included in the BPP and advising the ECoW on all ornithological matters (e.g., pre-commencement surveys, appropriate exclusion zones around any nest sites and any additional mitigation required to protect Schedule 1, 1A and Annex I species from disturbance or harassment).
Toolbox talk	A 'toolbox talk' would be delivered by the ECoW to ensure that all contractors working on the Proposed Development are aware of ornithological sensitivities and relevant legislation.
Timing of works	Where possible, construction works would take place outside the main breeding bird season (March to August inclusive).
Pre-construction checks for	Crossbill is listed on Schedule 1 to the W&CA and could potentially be breeding in coniferous woodland within the Proposed Development footprint and surrounding area. As the breeding season for crossbill species is defined as January to mid-December (NatureScot, 2021), a pre-construction check of areas of suitable habitat for nesting

Type of Measure	Description
breeding crossbill (*Loxia curvirostra*)	crossbill within 200 m of felling or other works would be completed by a suitably experienced and qualified ECoW, ahead of any construction works, regardless of the time of year.
Pre-construction surveys for other breeding Schedule 1/Annex I species	Where construction works are required during the breeding bird season and suitable habitat is present for breeding Schedule 1 and/or Annex I species, a suitably experienced and licenced ornithologist would complete targeted surveys for all relevant species, during the breeding season prior to commencement of construction works, to identify any nests or breeding territories (suspected or confirmed). The survey area would extend to the maximum disturbance buffer distance for the relevant species recommended in NatureScot (2022) guidance and would include nest sites identified during recent baseline surveys for the Proposed Development and surrounding developments (reviewed as part of the desk study), where suitable habitat still exists. The survey methods (including number of survey visits and timings) would be in accordance with standard species-specific surveys, as recommended in NatureScot (2017). Where works are scheduled to commence partway through the breeding season, NatureScot would be consulted to determine whether surveys should take place during that season and/or the preceding breeding season, and how many survey visits would be required per year. The survey findings would inform any additional mitigation measures deemed necessary to protect Schedule 1/Annex I breeding species from disturbance during construction of the Proposed Development.
Pre-construction checks for nesting birds	In addition to the surveys for breeding Schedule 1/Annex I species outlined above, prior to any felling or vegetation clearance within the breeding season (March to August inclusive), checks of the relevant works areas for nesting birds (all species) would be completed immediately prior to (within the preceding 72 hours) commencement of works in the relevant area. Where there is potential for Schedule 1/Annex I species to be present, checks would be completed by a suitably experienced and licensed ornithologist; where this is not the case, checks may be completed by the ECoW. For species listed on Schedule 1 to the WC&A and/or Annex I of the Birds Directive, as well as other non-passerine species of conservation concern, the search area would include suitable nesting habitat within a species-specific buffer of the works area. The buffer distance would be determined by the appointed ornithologist but, as a minimum, would be the maximum disturbance buffer in NatureScot (2022) guidance. For other species (e.g., passerines), it is proposed that suitable nesting habitat within a 50 m buffer around the works area would be an appropriate search area.
Protection of all nesting birds	If any nests or confirmed/suspected breeding territories of species listed on Schedule 1 to the W&CA or Annex I of the Birds Directive, are identified during pre-construction surveys or pre-construction nest checks, an exclusion zone around the nest (or territory) would be established. For breeding Schedule 1/Annex I species and non-passerine species, the exclusion zone would be appropriate to the species, in accordance with NatureScot (2022). For passerines species (except those listed on Schedule 1 to the W&CA), it is proposed that a 10 m exclusion zone would be appropriate. No works would be permitted within the exclusion zone and no personnel or vehicles would be allowed to enter or pass through it until the ECoW has confirmed that the breeding attempt has concluded. Where this is not feasible, NatureScot would be contacted, and further mitigation measures agreed to ensure compliance with relevant legislation protecting breeding birds. This could involve, for example, minimising the number of personnel and/or vehicles permitted to access the relevant area, restricting working hours, and employment of an ECoW to undertake a watching brief.

Type of Measure	Description
Additional protection of breeding Schedule 1/Annex I species	Additional, targeted measures to protect breeding Schedule 1/Annex I species throughout the construction phase of the Proposed Development would be required for hen harrier and may also be required for other species. It is therefore proposed that targeted species protection plans are produced as required for relevant species, which would include hen harrier as a minimum. Any additional species requiring a targeted protection plan would be identified during the pre-construction bird surveys, nesting bird checks and regular site presence of the professional ornithologist and appointed ECoW. Specific mitigation measures would be agreed with NatureScot but would likely include implementation of an appropriate disturbance buffer within which works are excluded whilst breeding birds are present, avoiding works within a wider buffer area during the most sensitive period early in the nesting attempt (Hardey *et al*., 2013) and/or during periods of cold or wet weather, restricting working hours to allow birds sufficient time to forage and a watching brief of any nests by a suitably experienced and licensed ornithologist whilst works are ongoing.
Surveys for roosting Schedule 1A species	If any roosting Schedule 1A species are identified within the Proposed Development footprint or surrounding area (at any time of year) and no measures are taken to protect them from disturbance, this could be considered to constitute reckless harassment. Therefore, where works are proposed in areas of suitable roosting habitat for a Schedule 1A species, regardless of the time of year, it is proposed that a pre-construction survey would be undertaken by a suitably experienced ornithologist, prior to commencement of works, to identify any regular roost sites. The survey area should include suitable habitat within 750 m of the works for hen harrier, within 500 m for eagle species and within 300 m for red kite[4], and surveys should follow the methods detailed in Hardey *et al*. (2013).
Protection of roosting Schedule 1A species	If any Schedule 1A species are confirmed or suspected to be roosting within 300-750 m of construction works (with the exact distance dependent on the species, as listed above), a specific protection plan would be developed to avoid disturbance to this species. Specific mitigation measures would be agreed with NatureScot but would likely include implementation of an appropriate disturbance buffer within which works are excluded whilst roosting birds are present.

8.9.9 Compared with construction works, routine operational maintenance is expected to be limited both spatially and temporally. However, should significant operational maintenance works be required during the breeding bird season, or if any roosting Schedule 1A species are suspected or confirmed to be present, implementation of the mitigation measures outlined above in **Table 8.6** would be implemented to protect breeding birds and roosting Schedule 1A species, and ensure compliance with relevant legislation.

8.9.10 As decommissioning works are likely to be of a similar nature and duration as construction activities, it is proposed that the mitigation outlined above would also be implemented during the decommissioning phase, following review and update (if required) to ensure compliance with relevant guidance and legislation at the time.

8.10 Assessment of Likely Significant Effects

Identification of IOFs

8.10.1 An evaluation of the importance of ornithological features identified during the field surveys and/or desk study is provided in **Table 8.7**.

[4] As the Proposed Development is outside the current wintering range for this species (Balmer *et al*., 2007), it is considered unlikely that roosting red kite will be present. However, as the range is expanding and potentially suitable habitat is present, it has been included for completeness.

8.10.2 Statutory sites and species evaluated as being of Regional or higher importance are considered to be IOFs and are taken forwards for detailed assessment in subsequent sections, while those of Local or lower importance are not considered to be IOFs and have been scoped out of the assessment.

8.10.3 Note, however, that the BPP described above in Section 8.9 'Mitigation by Design and Embedded Mitigation' would ensure that all breeding birds are protected during construction works, including those of Local or lower importance.

8.10.4 In addition, the Outline HMP, which forms **Appendix 7.8**, is likely to benefit a range of upland breeding birds, including some species not identified as IOFs.

Table 8.7: Evaluation of Important Ornithological Features

Importance Level*	Ornithological Feature	Justification
International	Caithness and Sutherland Peatlands SPA and Ramsar site	The Proposed Development overlaps with this internationally designated statutory site, and several of the qualifying features were recorded during field surveys, and/or identified during the desk study, within the relevant study areas. This included several breeding species.
	Golden plover Greenshank Red-throated diver Black-throated diver Hen harrier Merlin	These six species are designated features of the Caithness and Sutherland Peatlands SPA and Ramsar site and breeding birds were recorded during field surveys, and/or identified during the desk study, within the relevant study areas.
National	West Halladale SSSI Lochan Buidhe Mires SSSI	Based on the proximity of these nationally important statutory sites to the Proposed Development (the former of which overlaps the Proposed Development and the latter of which is <2 km away) and records of notified features identified during the field surveys, and/or desk study, there is considered to be connectivity with both SSSIs.
Regional	Osprey White-tailed eagle	Neither species is a qualifying/notified feature of any nationally or internationally designated site with potential connectivity to the site where the Proposed Development is located. However, both species are listed on Schedule 1 to the W&CA, Annex I of the Birds Directive, the UK Birds of Conservation Concern (BoCC) Amber list (Stanbury *et al*., 2021) and the Scottish Biodiversity List (SBL). Additionally, white-tailed eagle is listed on Schedules 1A and A1 to the W&CA. Registrations of both species were infrequent and no white-tailed eagle breeding territories were identified within 6 km of the Proposed Development. However, an osprey nest site and white-tailed eagle roost site were identified within 2 km.
Local	North Caithness Cliffs SPA	Although this is a statutory site of international nature conservation importance, the Proposed Development is located outside the core foraging range for breeding peregrine (2 km; NatureScot, 2016b) and the habitats present are considered unsuitable to support breeding or foraging seabirds. As such, there is not considered to be any connectivity with this SPA.

Importance Level*	Ornithological Feature	Justification
	North Sutherland Coastal Islands SPA	Although this is a statutory site of international nature conservation importance and the Proposed Development is located within the core foraging range for non-breeding barnacle goose (15 km; NatureScot, 2016b), the species was not recorded during the field surveys and no records were identified during the desk study. Furthermore, it is considered that the habitats around the Proposed Development are unsuitable for foraging barnacle goose. As such, there is not considered to be any connectivity with this SPA.
	Caithness Lochs SPA and Ramsar site	Although this is a statutory site of international nature conservation importance and the Proposed Development is located at the edge of the core foraging range for non-breeding greylag goose (15-20 km; NatureScot, 2016b), which is a qualifying feature of the SPA, low levels of flight activity were recorded, and there was no evidence that greylag geese regularly commuted over the Proposed Development footprint or foraged in the area (and habitats are generally considered to be sub-optimal for greylag goose). As such, there is not considered to be any connectivity with this SPA.
	Wigeon Common scoter Dunlin Wood sandpiper Golden eagle Short-eared owl Peregrine	Although these species are designated features of SPAs within the study area, there were no records of common scoter or wood sandpiper during the field surveys, and none were identified within 2 km during the desk study. For the other species, no records of breeding birds within the maximum species-specific disturbance buffer in NatureScot (2022) guidance were recorded during field surveys or identified during the desk study. Additionally, where flights were recorded, these were infrequent and/or several hundred metres from the Proposed Development, with no commuting routes identified over/towards it for any species. Based on the habitats present and patterns of historical activity, it is considered unlikely that levels of breeding or flight activity around the Proposed Development would change to such an extent in the future that there could be significant effects on breeding populations of any of these species.
	Greylag goose Pink-footed goose Whooper swan	All three species are included on the UK BoCC Amber List (Stanbury *et al*., 2021). Whooper swan is also included on the SBL, Schedule 1 to the W&CA and Annex I of the Birds Directive, although the Schedule 1 listing relates to breeding birds, which are not present within/around the Proposed Development. There is not considered to be any connectivity with any SPA populations of greylag goose, pink-footed goose or whooper swan, and levels of flight activity recorded during flight activity surveys for the Proposed Development and surrounding developments (reviewed as part of the desk study) were low. A small number of breeding greylag goose records were identified in the wider area during the desk study, but based on proximity, none were considered

Importance Level*	Ornithological Feature	Justification
		to be at risk of any impacts from the Proposed Development. Based on the habitats present and patterns of historical activity, it is considered unlikely that levels of flight activity around the Proposed Development would change to such an extent in the future that there could be significant effects on populations of any of these species.
	Teal Red grouse Cuckoo Curlew Sparrowhawk	These non-passerine species are all included on the UK BoCC Red or Amber List (Stanbury *et al*., 2021) and/or SBL. A single curlew breeding territory approximately 1.5 km to the southwest of the Proposed Development during 2017 surveys for Strathy North Wind Farm was the only breeding territory of this species identified during the desk study; none were recorded during field surveys for the Proposed Development. Similarly, low numbers of territories recorded during surveys for Strathy North Wind Farm were the only breeding records for sparrowhawk (a single territory in 2016) and cuckoo (1-2 territories during all years except 2018). Four teal territories were identified during the 2021 surveys at Strathy North Wind Farm and at least one breeding territory was considered to be present during both the 2018 and 219 surveys for Strathy Wood Wind Farm. Variable numbers of red grouse territories (0-12) were recorded during the Strathy North Wind Farm surveys. Levels of flight activity by these species during surveys for the Proposed Development and surrounding developments (reviewed as part of the desk study) were low. Based on the low levels of activity and small numbers of breeding territories, particularly in the context of Scottish breeding populations, it is not considered that the Proposed Development could have a significant effect on breeding populations of any of these species. It is considered unlikely that there would be any marked changed in levels of breeding or flight activity around the Proposed Development by any of these species in future that could result in significant effects.
	Mallard Black-headed gull Great black-backed gull Herring gull Great skua Kestrel	These species are all are included on the UK BoCC Red or Amber List (Stanbury *et al*., 2021) and/or SBL. Low levels of flight activity by these species were recorded during surveys for the Proposed Development and/or nearby developments (reviewed as part of the desk study), but no records of breeding territories were identified during the field surveys or desk study. Given the low levels of flight activity and absence of breeding records, the area around the Proposed Development is not considered to be of particular importance for any of these species and there is not considered to be any potential for population level effects.

Importance Level*	Ornithological Feature	Justification
	Oystercatcher Snipe Common sandpiper	All three species were holding 1-2 breeding territories within 500 m of the Proposed Development during the 2019 and/or 2022 surveys for the Proposed Development. Additionally, snipe and common sandpiper were breeding during most or all monitoring years at Strathy North Wind Farm (0-5 and 1-3 territories per year respectively), and a single possible common sandpiper territory was identified during 2019 surveys for Strathy Wood Wind Farm. However, not all of these territories were within 500 m of the Proposed Development. Given the low numbers present, which represent small proportions of the Scottish breeding populations (84,500-116,500 oystercatcher pairs, 34,000-40,000 snipe pairs and 17,000-24,000 common sandpiper pairs; Forrester *et al*., 2017), the area around the Proposed Development is not considered to be of particular importance for any of these species. Furthermore, breeding birds would be protected through implementation of the BPP outlined above in Section 8.9. As such, there is not considered to be any potential for population level effects on any of these species.
	Red kite Hobby	Both species are listed on Schedule 1 to the W&CA and the SBL; red kite is also included on Schedule 1A of the Act and Annex I of the Birds Directive. However, registrations of red kite and hobby were infrequent, and the Proposed Development is outside the breeding range of both species (Balmer *et al*., 2013). It is considered unlikely that levels of activity around the Proposed Development would change to such an extent in the future that there could be significant effects on breeding populations of either species.
	Crossbill	There were no records of crossbill during ornithology field surveys, although the survey methods used are not designed to target this species and it is possible that birds could be breeding in the coniferous woodland habitat present within and adjacent to the Proposed Development footprint. However, it is unlikely that crossbill would be breeding in notable numbers and there is not considered to be any potential for the Proposed Development to have any population-level effects. Although crossbill is listed on Schedule 1 to the W&CA, NatureScot (2017) guidance on survey methods for onshore wind farm developments advises that, while this species may need to be taken into account for developments in commercial forestry in relation to species protection plans, any survey required would be undertaken prior to construction following. To ensure compliance with legislation protecting Schedule 1 species, pre-construction checks for breeding crossbill are included within the BPP.
	Passerine species listed on the UK BoCC Red or Amber list (Stanbury *et al*., 2021) and/or SBL	Passerine species are not generally considered to be of concern in relation to potential impacts from OHLs (NatureScot, 2016a) and it is considered unlikely that the

Importance Level*	Ornithological Feature	Justification
		Proposed Development would have a significant impact on any passerine populations.
Less than local	Black grouse	Although it Is included on the UK BoCC Red list (Stanbury *et al*., 2021) and the SBL, there were no records of black grouse during the field surveys or desk study and the Proposed Development is outside the species breeding range (Balmer *et al*., 2013).
	All species not covered above, i.e., Green-listed species of low conservation concern that are not listed on Schedule 1 to the W&CA or Annex I of the Birds Directive	Species that are generally common, widespread and of low conservation concern, and which are considered to be at low risk of adverse population-level effects from wind farm developments. Although the Proposed Development is not a wind farm, these species were not present in exceptional or unusual numbers and the risk of significant adverse population-level effects from the Proposed Development on any of these species is considered to be negligible.
*IOFs of Local or lower importance (shaded) have been scoped out of the OIA		

Construction Effects

8.10.5 As stated in paragraph 8.7.16, the main ways in which the Proposed Development could affect IOFs during the construction phase are via:

- Habitat loss and degradation due to construction of the Proposed Development and associated infrastructure, including new access tracks; and
- Disturbance/displacement resulting from the presence of personnel and presence/use of vehicles and machinery during construction of the Proposed Development.

8.10.6 Direct habitat loss relates to the loss of habitat to infrastructure (including new access tracks). Indirect effects relate to habitat fragmentation and or degradation related to proximity of construction activities.

8.10.7 Note that habitat loss does not include functional loss; i.e., where disturbance or displacement would constrain use of a particular area of habitat by an IOF for breeding, foraging and/or roosting. This is assessed separately under disturbance/displacement.

8.10.8 As described in **Chapter 7 - Ecology**, an area of 8.19 ha would be lost due to construction of the Proposed Development (predominantly blanket bog). This includes 2.19 ha of direct permanent habitat loss, 3.87 ha of temporary habitat loss and 2.13 ha of indirect permanent habitat loss due to habitat change. Further details of habitat loss calculations are included in **Chapter 7**.

8.10.9 During the construction phase of the Proposed Development there would be increased levels of activity by site personnel, vehicles and machinery, resulting in increased levels of noise and visual disturbance. This could lead to the temporary disturbance and/or displacement of breeding, foraging and/or roosting birds. The magnitude of potential effects depends on the following:

- The timing of the works;
- The magnitude of the disturbance;
- The extent of displacement (both spatially and temporally);
- The availability of suitable habitats in the surrounding area for any displaced birds to occupy; and
- The behavioural sensitivity of the relevant bird species.

8.10.10 Potential construction effects of the Proposed Development on each IOF are assessed below, with IOFs considered in order of importance level (and by taxonomic order[5] within each importance category). To minimise repetition, species of the same Importance level, and with similar habitat requirements and ecology, are assessed together.

Caithness and Sutherland Peatlands SPA and Ramsar Site

8.10.11 The Caithness and Sutherland Peatlands SPA is designated for breeding populations of the following species: wigeon, common scoter, golden plover, dunlin, wood sandpiper, greenshank, red-throated diver, black-throated diver, golden eagle, hen harrier, short-eared owl and merlin. With the exception of the four raptors (the latter four species), these species are also qualifying features of the Caithness and Sutherland Peatlands Ramsar site.

8.10.12 With the exception of common scoter, for which the latest assessed[6] condition (in June 2013) is 'Unfavourable Declining' and short-eared owl, the condition of which was not assessed, the latest assessed condition of each qualifying feature is categorised as 'Favourable Maintained' (NatureScot, undated a).

8.10.13 The Proposed Development overlaps the Caithness and Sutherland Peatlands SPA and Ramsar site and, in total, 2.57 ha of habitat within the SPA and Ramsar site would be lost due to construction of the Proposed Development. This includes 0.42 ha of direct permanent habitat loss, 1.08 ha of temporary habitat loss and 1.07 ha of indirect permanent habitat loss due to habitat change. The total habitat loss (2.57 ha) represents 0.002 % of the SPA and Ramsar site which cover 147,726.54 ha (NatureScot, 2023a) and 145,960.53 ha[7] (NatureScot, 2023b) respectively. Potential effects on the SPA itself due to habitat loss are assessed as being of low magnitude and **not significant** under the EIA Regulations.

8.10.14 Although potential indirect effects on SPA habitats due to habitat degradation associated with construction works is possible, e.g., due to pollution, during construction of the Proposed Development would be avoided through implementation of relevant mitigation measures detailed in **Appendix 3.5: SSEN Transmission General Environmental Management Plans (GEMPs)** and **Appendix 3.7: Outline Construction Environmental Management Plan (CEMP)**, both within Volume 4 of this EIA Report. As such, they are assessed as being of low magnitude and **not significant** under the EIA Regulations.

8.10.15 As there is some overlap between the Proposed Development Site and the Caithness and Sutherland Peatlands SPA, there is potential for direct and indirect impacts to qualifying features within the SPA itself due to habitat loss (i.e. loss of nesting and foraging habitat) and disturbance/displacement of breeding and foraging birds during construction of the Proposed Development. However, implementation of the BPP would protect all breeding birds, including qualifying features of the SPA.

8.10.16 Potential construction phase effects on individual qualifying features of the SPA are discussed below for the relevant species, with further details of the assessment of potential construction phase effects on hen harrier and merlin presented in **Appendix 8.2**.

8.10.17 The potential for LSEs on the SPA is considered separately in **Appendix 8.4**, which provides information to inform the HRA of the SPA to be undertaken by Scottish Ministers as competent authority for the consideration of the Proposed Development.

[5] Hierarchical ranking system used to classify organisms

[6] By NatureScot

[7] The Caithness and Sutherland Peatlands site boundary lies within the Caithness and Sutherland Peatlands SPA, which underpins all the bird features of the Ramsar site and is coincident with the Caithness and Sutherland Peatlands Special Area of Conservation (SAC), which underpins the other features of the Ramsar site (NatureScot, 2023b).

Golden Plover and Greenshank

8.10.18 Breeding golden plover and greenshank are both qualifying features of the Caithness and Sutherland Peatlands SPA and Ramsar site. The SPA populations were estimated at 1,064 golden plover pairs in 1993 and 1994 and at least 653 greenshank pairs in 2009 (NatureScot, 2023a). However, a spreadsheet of collision rates for developments in North Highland (dated 29/05/2024) provided by NatureScot to inform the cumulative assessment cites 1,922 golden plover breeding pairs as the most recent SPA population estimate, based on 2009 Site Condition Monitoring (SCM).

8.10.19 During surveys for the Proposed Development, a single possible golden plover breeding territory was identified within 500 m of the footprint of the Proposed Development (in 2022). Several golden plover breeding territories were also recorded each year during the 2016-19 and 2021 Strathy North Wind Farm operational monitoring, as well as the 2018 and 2019 surveys for Strathy Wood Wind Farm. However, only two of these (both recorded in 2021) were within 500 m of the Proposed Development.

8.10.20 A single greenshank breeding territory was also identified within 500 m of the footprint of the Proposed Development during the 2019 scarce breeding bird survey. This was located within the Limit of Deviation (LoD) for the Proposed Development. A second greenshank territory was identified within the wider survey area (within 2 km of the Proposed Development) during the 2019 scarce breeding bird survey. Additionally, several greenshank breeding territories were recorded each year during the 2016-19 and 2021 Strathy North Wind Farm operational monitoring, as well as the 2018 and 2019 surveys for Strathy Wood Wind Farm, of which a single territory (recorded in a similar location during all survey years) was within 500 m of the Proposed Development, but outwith the LoD.

8.10.21 As a single greenshank territory was recorded within the LoD for the Proposed Development, there is the potential for a nest site used by this species to be lost. However, the territory was only recorded within the LoD for the Proposed Development during a single survey year (indicating that it may not be an established/recurrent territory). Additionally, greenshank territories varied in terms of number and location between survey years, indicating that any displaced birds could breed at a different location within the surrounding area.

8.10.22 While some of the additional habitat that would be lost could also be potentially suitable for nesting and/or foraging golden plover and greenshank, there is no evidence to suggest the areas being lost are particularly valuable or exceptional as breeding or foraging habitat for either species.

8.10.23 Furthermore, given the limited extent of habitat that would be lost, relatively large core foraging range of breeding birds (3 km for golden plover and 2 km for greenshank; NatureScot, 2016) and presence of extensive suitable habitat within the wider area, including the Caithness and Sutherland Peatlands SPA, the effects of habitat loss on the SPA breeding golden plover and greenshank populations are considered to be of negligible and low magnitude respectively, and **not significant** under the EIA Regulations.

8.10.24 As there is some overlap between the Proposed Development and the Caithness and Sutherland Peatlands SPA, there is potential for direct disturbance to the SPA breeding golden plover and greenshank populations due to construction of the Proposed Development. NatureScot (2022) guidance recommends a disturbance buffer of 200-500 m for breeding golden plover and 300-500 m for breeding greenshank. As noted above, a maximum of two golden plover pairs and two greenshank pairs were present within 500 m of the Proposed Development during a single survey year (in 2021 and 2021 respectively). However, implementation of the BPP (outlined above in Section 8.9 would ensure that any breeding birds are protected from disturbance during construction of the Proposed Development.

8.10.25 As such, effects on the Caithness and Sutherland Peatlands SPA golden plover and greenshank breeding populations due to disturbance/displacement during the construction of the Proposed Development are assessed as being of negligible magnitude and **not significant** under the EIA Regulations.

Red-throated and Black-throated Divers

8.10.26 Breeding red-throated and black-throated divers are both qualifying features of the Caithness and Sutherland Peatlands SPA and Ramsar site. The SPA populations were estimated at 46 red-throated diver pairs in 2006 and 26 black-throated diver pairs in 1994 (NatureScot, 2023a). A more recent estimate for the SPA breeding black-throated diver population was 29 pairs in 2006 (Stroud *et al*., 2016). However, the spreadsheet of collision rates for developments in North Highland (NatureScot, 2024), informing the cumulative assessment, cites 20 black-throated diver breeding pairs as the most recent SPA population estimate, based on 2018 SCM.

8.10.27 No red-throated diver breeding territories were recorded during the 2019 or 2022 surveys for the Proposed Development. A single, confirmed nest in the wider area (more than 2 km from the Proposed Development) was recorded during surveys for Strathy Wood Wind Farm in 2018 and was also active in 2019. As reported in the most recent Further Environmental Information (FEI) for Strathy Wood Wind Farm (Atmos, 2019), this is a traditional territory that has been used regularly for a number of years. Red-throated diver was also confirmed or potentially nesting on the same loch, or a nearby un-named lochan (within the same loch complex) each year during the 2016-19 and 2021 surveys for Strathy North Wind Farm, although note that there was only ever considered to be a single breeding pair present at the loch complex.

8.10.28 Red-throated diver was recorded on numerous additional lochs in one or more years during the 2016-19 and 2021 Strathy North Wind Farm surveys, but of these, this species was only confirmed or suspected to be breeding at two of them, both of which were more than 2 km from the Proposed Development.

8.10.29 During surveys for the Proposed Development, a single black-throated diver breeding territory was identified within 2 km of the Proposed Development footprint during the 2019 scarce breeding bird survey. Confirmed or potential breeding at this loch also took place each year during the 2016-19 and 2021 surveys for Strathy North Wind Farm. Black-throated diver was also confirmed or potentially breeding at a nearby loch (within 2 km of the Proposed Development) during the 2017 and 2021 surveys for Strathy North Wind Farm.

8.10.30 Two additional black-throated diver nests were identified within 2 km of the Proposed Development during the 2016 surveys at Strathy North Wind Farm. During the 2021 Strathy North Wind Farm surveys, black-throated diver was confirmed to be nesting at a third location more than 2 km from the Proposed Development, and an unidentified diver species was confirmed to have bred at another location more than 2 km away (although it is considered likely that this was red-throated diver). There were no records of breeding black-throated diver surveys during the 2018 and 2019 surveys for Strathy Wood Wind Farm.

8.10.31 As there is no suitable nesting or foraging habitat for red-throated or black-throated divers within the LoD of the Proposed Development, there is not considered to be any potential for habitat loss on SPA breeding populations of either species during construction of the Proposed Development and effects are considered to be **not significant** under the EIA Regulations.

8.10.32 NatureScot (2022) guidance recommends a disturbance buffer of 500-750 m for breeding red-throated and black-throated divers. Given that all breeding lochs are more than 1-2 km from the Proposed Development for black-throated and red-throated divers respectively, there is not considered to be any potential for disturbance to SPA breeding populations of either species during construction of the Proposed Development and effects are considered to be **not significant** under the EIA Regulations.

Hen harrier and Merlin

8.10.33 Breeding hen harrier and merlin are both qualifying features of the Caithness and Sutherland Peatlands SPA. The SPA populations were estimated at 14 hen harrier pairs in 1993 to 1997 and 54 merlin pairs in 1993 and 1994 (NatureScot, 2023a). More recent estimates for the SPA breeding populations were 19 hen harrier pairs in 2003 and 11 merlin pairs in 2006 (Stroud *et al*., 2016). However, the NatureScot (2024) spreadsheet cites 13 hen harrier pairs as the most recent SPA breeding population estimates, based on 2016 SCM.

8.10.34 During 2019 surveys for the Proposed Development, hen harrier was confirmed to be nesting within 2 km. The same territory was also identified during 2019 surveys for Strathy North and Strathy Wood wind farms, but there were no records of breeding hen harrier at this location during the 2022 surveys for the Proposed Development or during 2016-18 and 2021 monitoring for Strathy North Wind Farm. A second hen harrier territory was identified within 2 km of the Proposed Development during the 2019 surveys for the Proposed Development but was presumed abandoned following an extensive wildfire in May of that year. This territory was also active during the 2017 and 2018 surveys for Strathy North Wind Farm.

8.10.35 An additional hen harrier breeding territory, more than 2 km from the Proposed Development, was active during the 2017 and 2018 surveys for Strathy North Wind Farm, as well the 2018 and 2019 surveys for Strathy Wood Wind Farm but was also presumed to have been abandoned following the May 2019 wildfire.

8.10.36 Merlin was also confirmed to be nesting within 2 km during 2019 surveys for the Proposed Development. The same territory was recorded during the 2019 surveys for Strathy North Wind Farm. There were no records of breeding merlin at this location during 2022 surveys for the Proposed Development or during 2016-18 and 2021 monitoring for Strathy North Wind Farm. Up to three additional merlin territories within 2 km of the Proposed Development were recorded in one or more years during the 2016-19 and 2021 Strathy North Wind Farm surveys.

8.10.37 In the absence of mitigation, potential effects on the SPA breeding hen harrier population due to construction effects are assessed as being of medium to low magnitude and **potentially significant**. Further details of the assessment are presented in **Appendix 8.2** within Volume 4 of this EIA Report.

8.10.38 As none of the breeding merlin territories are located within the LoD for the Proposed Development, there is not considered to be any potential for nest sites to be lost. While some of the additional habitat that would be lost could also be suitable for nesting and/or foraging merlin, there is no evidence to suggest the areas being lost are particularly valuable or exceptional habitats.

8.10.39 Furthermore, given the limited extent of habitat that would be lost, relatively large core foraging range of breeding birds (within 5 km of the nest site; NatureScot, 2016) and presence of extensive suitable habitat within the wider area, including the Caithness and Sutherland Peatlands SPA, the effects of habitat loss on the SPA breeding merlin population are considered to be of negligible magnitude and **not significant** under the EIA Regulations.

8.10.40 Potential effects on the SPA breeding merlin population due to disturbance/displacement during construction are assessed as being of low magnitude and **not significant**. Further details are presented in **Appendix 8.2** within Volume 4 of this EIA Report.

West Halladale SSSI

8.10.41 The West Halladale SSSI is designated for breeding common scoter, breeding black-throated diver and its breeding bird assemblage (as well as blanket bog). The SSSI citation (NatureScot, undated b) notes that the breeding bird assemblage includes several waterfowl and wader species such as greylag goose, black-throated diver, golden plover, dunlin and greenshank, while steep slopes and areas of drier ground within the SSSI are

suitable for a range of other species, including hen harrier and merlin. Golden eagle and peregrine also regularly hunt over the SSSI.

8.10.42 The Proposed Development overlaps the West Halladale SSSI and, in total, 2.57 ha of habitat within the SSSI would be lost (including permanent, temporary and indirect permanent habitat loss) due to construction of the Proposed Development. This represents 0.03 % of the SSSI, which covers 8,658.85 ha (NatureScot, undated b). Potential effects on notified avian features of the SSSI due to loss of supporting habitat are assessed as being of low magnitude and **not significant** under the EIA Regulations. Note that effects on non-avian features of the SSSI are considered in **Chapter 7**.

8.10.43 Potential indirect effects on SSSI habitats during construction of the Proposed Development, e.g., due to pollution during construction of the Proposed Development, would be avoided through implementation of relevant mitigation measures detailed in **Appendices 3.5** and **3.7** within Volume 4 of this EIA Report. As such, they are assessed as being of low magnitude and **not significant**.

8.10.44 As there is some overlap between the Proposed Development Site and the West Halladale SSSI, there is potential for direct disturbance to notified features within the SSSI itself due to construction of the Proposed Development. Although black-throated diver was breeding in the wider area, there were no nest sites within 1 km of the Proposed Development (as discussed in paragraphs 8.10.29 to 8.10.32). Potential construction phase effects on this notified feature of the SSSI are discussed further in paragraphs 8.10.26 to 8.10.32.

8.10.45 While some component species of the breeding bird assemblage were also breeding in proximity to the Proposed Development, implementation of the BPP would ensure that breeding birds are protected during construction of the Proposed Development and effects are assessed as being of low magnitude and **not significant** under the EIA Regulations.

Lochan Buidhe Mires SSSI

8.10.46 The Lochan Buidhe Mires SSSI is designated for its breeding bird assemblage (as well as blanket bog). The SSSI citation (NatureScot, undated c) notes that the breeding bird assemblage includes several waterfowl and wader species such as greylag goose, golden plover, curlew, dunlin, greenshank and red-throated and black-throated divers, while raptors such as merlin, peregrine and golden eagle use the area for hunting and are also part of the breeding bird assemblage.

8.10.47 The Lochan Buidhe Mires SSSI is located approximately 1.9 km to the west of the Proposed Development. As there would be no habitat loss within or in close proximity to the SSSI, there is not considered to be any potential for direct or indirect effects on the SSSI habitats used by qualifying ornithological features due to habitat loss.

8.10.48 Although there is some potential for indirect effects due to loss of foraging habitat used by birds breeding within the SSSI, the extent of habitat that would be lost is very small in the context of available foraging habitat in the wider area, including within the SSSI itself, which covers an expanse of 4,122.76 ha (NatureScot, undated c). Furthermore, levels of activity by notified features of the SSSI (including component species of the breeding bird assemblage) were generally very low, suggesting that the area around the Proposed Development is not of particular importance to foraging birds.

8.10.49 As such, the effects on notified avian features of the Lochan Buidhe Mires SSSI due to loss of supporting habitat are considered to be of negligible magnitude and **not significant** under the EIA Regulations.

8.10.50 Given the separation distance between Lochan Buidhe Mires SSSI and the Proposed Development, there is not considered to be any potential for disturbance to nesting birds within the SSSI itself. Although there is some potential for birds breeding in the SSSI to be disturbed if they are foraging around the Proposed Development

during construction, this would be temporary, and it is considered that sufficient alternative foraging habitat is available in the wider area to support SSSI breeding populations.

8.10.51 As such, potential effects of disturbance on the Lochan Buidhe Mires SSSI during construction of the Proposed Development are considered to be of negligible magnitude and **not significant** under the EIA Regulations.

Osprey and White-tailed Eagle

8.10.52 The NHZ 5 breeding osprey population was estimated at eight pairs in 2013 (Wilson *et al*., 2015). However, there has been a significant increase in the numbers of breeding osprey pairs in the Highland region of 4.9 %, and in 2022, 28 osprey breeding sites in Sutherland were checked by Scottish raptor workers, of which 21 were occupied by pairs, with a further two occupied by single birds. Two additional breeding sites (both occupied by pairs) were reported in Caithness in 2022 (Challis *et al*., 2023).

8.10.53 Similarly, while the NHZ 5 breeding white-tailed eagle population was estimated at just one pair in 2013 (Wilson *et al*., 2015), the local population has increased as white-tailed eagle has expanded its range, and in 2022, nine breeding sites in Sutherland were checked by Scottish raptor workers, of which eight were occupied by pairs (Challis et al., 2023).

8.10.54 There were occasional records of osprey during the 2022 surveys for the Proposed Development as well as during the 2016, 2017 and 2021 surveys at Strathy North Wind Farm. In addition, there was an incidental record of an osprey nest within 2 km of the Proposed Development during ECoW pre-felling checks at Strathy North Wind Farm in mid-August 2023. The nest was regularly monitored, and a single (unaged) bird was observed, but there were no signs of breeding. Although it is possible that breeding could have occurred prior to the monitoring, juvenile dispersal typically occurs between late August and late September (Hardey *et al*., 2013).

8.10.55 Historically, an osprey nest was identified near the 2023 location during 2013 surveys for Strathy North Wind Farm, but no breeding activity was noted during surveys prior to this (surveys commenced in 2003), nor in 2014. Observations in 2015 indicated that ospreys were probably breeding at or near the same nest used in 2013. Further details are provided in **Appendix 8.3** within Volume 4 of this EIA Report. No osprey breeding activity was noted during the 2016-19 or 2021 operational monitoring at Strathy North Wind Farm, nor during the 2018 and 2019 surveys for Strathy Wood Wind Farm, or 2019 and 2021 surveys for the Proposed Development.

8.10.56 White-tailed eagle was occasionally recorded during surveys at Strathy North Wind Farm, but there was no evidence of breeding during the surveys and no breeding territories within 6 km were identified during the desk study. However, a roost site was identified within 2 km during ECoW pre-felling checks at Strathy North Wind Farm in September 2023.

8.10.57 There is no suitable nesting or roosting habitat for osprey or white-tailed eagle within the LoD for the Proposed Development. Although it is possible that some suitable white-tailed eagle foraging habitat would be lost, the extent would represent a fraction of the core foraging range used by breeding birds (the core foraging range during the breeding season is 5 km; NatureScot, 2016b). The effects of habitat loss on the NHZ 5 osprey and white-tailed eagle breeding populations are therefore considered to be of negligible magnitude and **not significant** under the EIA Regulations.

8.10.58 The osprey nest was more than 750 m from the Proposed Development, which is the maximum recommended disturbance buffer for this species in NatureScot (2022) guidance, and the extent of suitable nesting habitat within this buffer is limited. Similarly, the white-tailed eagle roost site was more than 500 m from the Proposed Development, which is the maximum recommended disturbance buffer for breeding and non-breeding white-tailed eagle in NatureScot (2022) guidance, and there is little or no suitable nesting/roosting habitat within this distance.

8.10.59 In the unlikely event that ospreys do nest within 750 m of the Proposed Development in future, or white-tailed eagle nests or roosts within 500 m (prior to construction), implementation of the BPP would ensure that birds would be protected from disturbance during construction of the Proposed Development.

8.10.60 As such, effects on the NHZ 5 breeding osprey and white-tailed eagle populations due to disturbance/displacement during the construction of the Proposed Development are assessed as being of negligible magnitude and **not significant** under the EIA Regulations.

Summary

8.10.61 A summary of construction phase effects on IOFs is presented in **Table 8.8**.

Table 8.8: Summary of Construction Phase Effects on IOFs

IOF	Importance Level	Potential Effect	Magnitude of Effect	Potentially Significant Effect?	Targeted Mitigation Required?
Caithness and Sutherland Peatlands SPA	International	Habitat loss/ degradation	Low	No	No
Golden plover	International	Habitat loss	Negligible	No	No
		Disturbance/ displacement	Negligible	No	No
Greenshank	International	Habitat loss	Low	No	No
		Disturbance/ displacement	Negligible	No	No
Red-throated diver	International	Habitat loss	Negligible	No	No
		Disturbance/ displacement	Negligible	No	No
Black-throated diver	International	Habitat loss	Negligible	No	No
		Disturbance/ displacement	Negligible	No	No
Hen harrier	International	Habitat loss	Medium to Low	Yes	Yes
		Disturbance/ displacement			
Merlin	International	Habitat loss	Negligible	No	No
		Disturbance/ displacement	Low	No	No
West Halladale SSSI	National	Habitat loss/ degradation	Low	No	No
		Disturbance/ displacement	Low	No	No
Lochan Buidhe Mires SSSI	National	Habitat loss/ degradation	Negligible	No	No
		Disturbance/ displacement	Negligible	No	No

IOF	Importance Level	Potential Effect	Magnitude of Effect	Potentially Significant Effect?	Targeted Mitigation Required?
Osprey	Regional	Habitat loss	Negligible	No	No
		Disturbance/ displacement	Negligible	No	No
White-tailed eagle	Regional	Habitat loss	Negligible	No	No
		Disturbance/ displacement	Negligible	No	No

Operational Effects

8.10.62 As stated in paragraph 8.7.17, the main ways in which an OHL may affect IOFs during the operational phase are via:

- Disturbance/displacement of breeding, roosting and/or foraging resulting from the presence of personnel, and presence/use of vehicles and machinery during operational maintenance of the Proposed Development.
- Mortality/injury due to birds colliding with the OHL, or electrocution if attempting to perch or nest on it.
- Barrier effects due to the Proposed Development presenting a barrier, either alone or cumulatively with other developments, to the movement of birds, restricting or displacing birds from much larger areas.

8.10.63 The increased human activity associated with maintenance of the Proposed Development has the potential to cause disturbance and displace birds from the area. However, the level of human activity and associated disturbance during operational works would be considerably reduced compared to the construction phase and is expected to be infrequent and of limited extent (both spatially and temporally).

8.10.64 If any significant maintenance works are required during the operational phase of the Proposed Development, the BPP measures outlined in Section 8.9 would be applied to ensure compliance with legislation protecting breeding birds, including species listed on Schedule 1 to the W&CA, as well as roosting species listed on Schedule 1A to the W&CA.

8.10.65 It is also possible that visual disturbance from the towers, poles and OHL could deter birds from making use of the surrounding area for foraging, breeding and/or roosting (although this would result in reduced collision risk). However, the Proposed Development is bordered by the operational Strathy North Wind Farm, as well as an access track and the existing Strathy North 132 kV trident 'H' wood pole OHL, indicating that local bird populations may already be habituated to the presence of large artificial structures such as poles, turbines, OHLs and roads in the landscape.

8.10.66 In terms of morphology and ecology, large, heavy-bodied bird species are generally thought to be more susceptible to collisions with overhead power lines than smaller, more manoeuvrable species (e.g., Luzenski *et al*., 2016). Species with limited visual capacity, and those flying in conditions of reduced visibility (e.g., during the hours of darkness), may also be more vulnerable to collisions, as may birds engaged in hunting or breeding displays. Additionally, younger and more inexperienced birds and migrants that are unfamiliar with the landscape may also be at increased collision risk (NatureScot, 2016a).

8.10.67 Landscape and topography as well as environmental conditions (e.g., adverse weather and/or low light) can also influence the risk of bird mortality due to collision with overhead power lines.

8.10.68 Birds can be at risk of electrocution from contact with unprotected wires and associated metal infrastructure. Large birds are generally more vulnerable to electrocution by OHLs due to the greater risk of bridging the gap

between two phase conductors, or energised and earthed structures, with open wings or other body parts (Lehman *et al*., 2007). Therefore, technical aspects of the design (e.g., spacing of conductors and the availability of perches) influences the level of risk, as well as a bird's body size and ecology/behaviour (e.g., Bevanger, 1994; NatureScot, 2016a).

8.10.69 Many bird species, particularly raptors, are attracted to OHLs and their supports, especially in open un-forested areas, as they provide lookout posts, as well as being used for perching, nesting and/or roosting. Ground-nesting species, such as hen harrier, rarely use OHL supports for perching / hunting and are therefore at less risk from electrocution (Haas *et al*., 2005). Of the identified IOFs, only osprey and white-tailed eagle are considered to be at risk of electrocution. However, as described above under 'Mitigation by Design and Embedded Mitigation', 'due to the designs used for both the steel lattice towers and trident 'H' wood poles, the risk of a significant number of mortality events is considered to be negligible. Therefore, potential mortality/injury due to electrocution has been scoped out of the OIA.

8.10.70 As detailed in **Chapter 3**, the Proposed Development would commence from a cable sealing end (CSE) compound in the vicinity of the Strathy Wood Wind Farm on-site substation and would include approximately 4.5 km of new double circuit 132 kV OHL supported by steel lattice towers and two new by trident wood poles (H Poles) and downlead spans of up to 18 m from each pole, for connection onto the existing Strathy North trident 'H' wood pole 132 kV OHL.

8.10.71 The heights of the steel lattice towers for the Proposed Development would vary, depending on local topography, and would typically be in the region of approximately 26-36 m in height, and the average height of the OHL would be approximately 30 m. The two proposed new trident 'H' wood poles would have a nominal height of approximately 13.5 - 15 m (including insulators and support). As the Proposed Development is largely located within the valley alongside the River Strathy, its height relative to the surrounding landscape would not be raised significantly due to local topographical features.

8.10.72 It is considered that red-throated and black-throated divers are the only IOFs that could potentially be affected by barrier effects, with any divers breeding to the south of the Proposed Development, potentially flying around it to forage at the coast.

8.10.73 Potential effects on IOFs during the operational phase of the Proposed Development are assessed below, with IOFs considered in order of importance level (and by taxonomic order within in each importance category). As for construction effects, to minimise repetition, species of the same Importance level and with similar habitat requirements and ecology are assessed together.

Golden Plover and Greenshank

8.10.74 As noted above, there is some overlap between the Proposed Development Site and the Caithness and Sutherland Peatlands SPA, and a maximum of two golden plover pairs and two greenshank pairs were present within 500 m of the Proposed Development during a single survey year (2021 and 2019 respectively). Assuming a worst-case scenario that two pairs of both species are permanently displaced due to the presence of the Proposed Development, this would represent 0.19 % of the SPA breeding golden plover population and 0.31 % of the SPA breeding greenshank population (1,064 and 653 pairs respectively; NatureScot, 2023a).

8.10.75 However, given that golden plover territories varied considerably in terms of number and location between survey years, and the extent of suitable breeding habitat present within the SPA, it is anticipated that any displaced birds would be accommodated in the surrounding area, rather than being lost entirely from the breeding population.

8.10.76 Similarly, one of the 2019 greenshank territories was only recorded during that survey year, with no records of breeding birds in the same area during other survey years (2016-18, 2021 and 2022), suggesting that this is not

a traditional territory. While some areas (more than 500 m from the Proposed Development) were regularly used by nesting greenshank, and some territory locations were fairly consistent between years, there was some annual variability in the locations of others and the total number of territories. As such, it is anticipated that any displaced birds would be accommodated in the surrounding area, rather than being lost entirely from the SPA breeding population.

8.10.77 Effects on the Caithness and Sutherland Peatlands SPA breeding golden plover and greenshank populations due to disturbance/displacement during the operation of the Proposed Development are assessed as being of negligible and low magnitude respectively and **not significant** under the EIA Regulations.

8.10.78 Levels of golden plover flight activity during surveys for the Proposed Development and neighbouring developments (reviewed as part of the desk study) were very low. Similarly, although there were several greenshank flights during breeding season flight activity surveys for Strathy North Wind Farm in 2016-19 and 2021 and Strathy Wood Wind Farm during 2018 and 2019, many of these were associated with breeding territories in the wider area, and all were more than 500 m from the OHL of the Proposed Development. Furthermore, no regular commuting routes across the Proposed Development were identified for either species. Levels of flight activity around the Proposed Development are not anticipated to increase post-construction.

8.10.79 As such, the potential effects of collision mortality to the SPA breeding golden plover and greenshank populations during operation of the Proposed Development are assessed as being of negligible magnitude for both species and **not significant** under the EIA Regulations.

Red-throated and Black-throated Divers

8.10.80 Given that all red-throated and black-throated diver breeding lochs are more than 2 km and 1 km from the Proposed Development respectively, there is not considered to be any potential for disturbance or displacement to nesting divers during operation of the Proposed Development and effects on SPA breeding populations of both diver species are considered to be **not significant** under the EIA Regulations.

8.10.81 Breeding red-throated divers typically fly to the sea to forage, or occasionally larger lochs (other than the breeding loch), carrying fish back to the chicks (e.g., Forrester *et al*., 2007; NatureScot, 2017). Similarly, breeding black-throated diver can forage at sea, and their territories often include nearby lochs used for fishing and sometimes as alternative breeding sites. Once established, both species tend to use traditional breeding sites in successive years (Forrester *et al*., 2007).

8.10.82 Both diver species could therefore be at risk of collision with the Proposed Development whilst commuting between their nest sites and foraging areas. Of the three breeding lochs/loch complexes where breeding red-throated divers have been recorded during surveys for the Proposed Development and surrounding developments in recent years (described above under Construction Effects and detailed in **Appendices 8.2** and **8.3** within Volume 4 of this EIA Report), it is considered that birds using a single loch complex are potentially at risk of collision with the OHL, the details of which are presented in **Appendix 8.2**.

8.10.83 A summary of historical data presented in the most recent FEI for Strathy Wood Wind Farm (Atmos, 2019) demonstrated that this is a traditional red-throated diver breeding territory used (since 2009) by a single pair. The 2019 FEI also summarises the four flight routes that are generally used by red-throated divers from this breeding site to commute between their breeding loch and foraging areas at sea. Birds flying along one of the four routes (described as the 'northern route') would potentially cross the Proposed Development at one or more points and could therefore be at risk of collision.

8.10.84 In contrast, levels of black-throated diver flight activity during surveys for the Proposed Development and surrounding developments (Strathy North and Strathy Wood wind farms, reviewed as part of the desk study) were low. Based on the locations of the three black-throated diver breeding territories identified during field

surveys and the desk study, levels of flight activity and flight directions, it is considered unlikely that birds would regularly commute across the Proposed Development.

8.10.85 Although divers are strong fliers, both species have a relatively large wing-loading (the ratio of body mass to wing area), which makes flight energetically expensive and means they gain height relatively slowly (Dierschke *et al*., 2017; Jackson, 2019) and could limit their ability to successfully avoid obstacles if detected a relatively short distance ahead of them. However, all breeding lochs, including the breeding red-throated diver loch complex described above, were over 1-2 km from the Proposed Development for red-throated and black-throated divers respectively, and it is anticipated that divers would be able to detect the Proposed Development sufficiently far in advance to allow them to take evasive action, either by adjusting their flight altitude, or adjusting their flight path.

8.10.86 Additionally, it is likely that some red-throated divers, and potentially black-throated divers, from the Caithness and Sutherland Peatlands SPA breeding population will routinely fly over existing power lines, such as the Strathy North 132 kV trident 'H' wood pole OHL, although it is acknowledged that the OHL for the Proposed Development would be much taller. Nonetheless, for both diver species, a large proportion of flight time recorded during the 2016-19 and 2021 flight activity and targeted diver surveys at Strathy North Wind Farm were at heights of ≥40 m, suggesting that any birds crossing the OHL are likely to fly above it.

8.10.87 There are no known records of collision mortality associated with existing OHLs or turbines in the vicinity of the Proposed Development, including at Strathy North Wind Farm, where at least ten red-throated diver flights have been recorded over or through the turbines since 2016.

8.10.88 Although collision risk could increase at night when power lines are more difficult to detect, as noted above, divers are visual hunters, and it is unlikely that they would commute between foraging and nest sites during the hours of darkness (Jackson, 2019). This is supported by Furness (2015) who notes that, although flight activity by red-throated diver seems to be highest around dawn, there is little evidence to suggest that divers fly to and from nesting sites during darkness. However, it is acknowledged that collision risk to adults provisioning their chicks could increase during conditions of poor visibility and strong winds.

8.10.89 The risk of mortality due to collision with the OHL is therefore considered to be very low for black-throated diver. As such, the potential for mortality to the Caithness and Sutherland Peatlands SPA breeding black-throated diver population due to collision with the OHL during operation of the Proposed Development is assessed as being of low magnitude and **not significant** under the EIA Regulations.

8.10.90 Although the risk of mortality to red-throated diver due to collision with the OHL is also considered to be low, it is acknowledged that, due to the location of a traditional breeding loch and evidence of regular commuting over the Proposed Development, this species is at increased risk of collision compared with black-throated diver. As a precautionary approach, in the absence of mitigation, the potential for mortality to the Caithness and Sutherland Peatlands SPA breeding red-throated diver population due to collision with the OHL during operation of the Proposed Development is assessed as being of medium to low magnitude and **potentially significant** under the EIA Regulations.

8.10.91 The Proposed Development could also result in a barrier effect to commuting red-throated divers breeding to the south and following the northern route to forage at sea, with birds avoiding the Proposed Development entirely ('macro-avoidance'), rather than crossing it. In contrast, based on the locations of black-throated diver breeding sites and flight patterns, there is not considered to be any potential for a barrier effect during operation of the Proposed Development on the SPA breeding population and **no significant effects** under the EIA Regulations.

8.10.92 Red-throated divers show strong macro-avoidance of offshore wind farms (Furness,2015), but evidence for displacement from onshore wind farm is limited. A study of red-throated divers breeding around the operational

Smøla Wind Farm in Norway (Halley & Hopshaug, P, 2007), which comprises 68 turbines with a tip height of 108-117 m (Statkraft, undated), reported that there were no flights observed through the turbine array during just over 46 hours of surveys in May and June, suggesting that the species was exhibiting strong macro-avoidance. However, red-throated diver flight activity in May and June when birds are often incubating (Gilbert *et al*., 1998) is generally low compared with later in the season when adults are feeding hatched young. Furthermore, as highlighted in Atmos (2019), since no observations were carried out before the wind farm was constructed, there is no baseline data with which to compare post-construction flight activity by red-throated diver. It is possible that the species has never, or only occasionally, flew over the area within which the wind farm is now located.

8.10.93 Furness (2015) cites a study by Upton (2012) which reported frequent red-throated diver flights through the five-turbine Burgar Hill Wind Farm on Orkney. Atmos (2019) reported that turbine tip heights are 75-116 m, and the wind farm is adjacent to a loch which holds breeding red-throated diver. The turbines are positioned between the loch and the coast to where red-throated divers fly to feed and divers have continued to fly through the array to reach the sea, demonstrating that birds will both fly between operational turbines and breed in proximity to them.

8.10.94 Based on the high levels of flight activity through Burgar Hill Wind Farm, Furness (2015) concluded that both breeding and visiting non-breeding red-throated divers were flying through the wind farm. No diver carcasses were found during carcass searches in any year (Upton 2012, 2014a, 2014b), indicating that red-throated divers can display high levels of avoidance of individual turbines ('meso-avoidance'). More recently, as noted above, a number of red-throated diver flights have been recorded over Strathy North Wind Farm, demonstrating that birds do sometimes fly over complex turbine arrays.

8.10.95 If foraging birds breeding to the south are displaced from the 'northern route' due to the presence of the Proposed Development, it is anticipated that they would follow one of the other three commuting routes identified, or could potentially adjust the northern route to fly to the west of the OHL, along the River Strathy, east of Strathy North Wind Farm. It is also possible that they could adapt the northern route to fly to the east of the proposed OHL, but this is perhaps less likely given the increasing elevation to the east.

8.10.96 Regardless of the commuting route selected by red-throated divers breeding to the south of the Proposed Development, it is considered that any potential increase in energy expenditure required to avoid the Proposed Development would be marginal. As such barrier effects on the Caithness and Sutherland Peatlands breeding red-throated diver population are assessed as being of low magnitude and **not significant** under the EIA Regulations.

Hen harrier and Merlin

8.10.97 In the absence of mitigation, potential effects on the Caithness and Sutherland SPA breeding hen harrier population during operation are assessed as being of medium to low magnitude and **potentially significant** under the EIA Regulations. Further details of the assessment are presented in **Appendix 8.2** within Volume 4 of the EIA Report.

8.10.98 Potential effects on the Caithness and Sutherland SPA breeding merlin population during operation are assessed as being of low magnitude and **not significant** under the EIA Regulations. Further details of the assessment are presented in **Appendix 8.2** within Volume 4 of the EIA Report.

West Halladale SSSI

8.10.99 As there is some overlap between the Proposed Development and the West Halladale SSSI, there is potential for direct disturbance to notified features within the SSSI itself during operation of the Proposed Development. Although black-throated diver was breeding in the wider area, there were no nest sites within 1 km of the

Proposed Development and there is not considered to be any potential for operational disturbance to this qualifying feature of the SPA.

8.10.100 Some component species of the breeding bird assemblage were also breeding small numbers in proximity to the Proposed Development, and component species may also forage around the Proposed Development. However, implementation of the BPP would reduce the risk of disturbance to breeding birds during operation of the Proposed Development. Additionally, it is anticipated that at least some of these species will be habituated to large artificial structures (such as turbines, OHLs and tracks/roads) within the landscape and would continue to nest and/or forage around the Proposed Development, while sufficient habitat is present in the surrounding area to accommodate any displaced birds.

8.10.101 As such, effects of operational disturbance on the West Halladale SSSI and its notified features, including components of the breeding bird assemblage, are assessed as being of low magnitude and **not significant** under the EIA Regulations.

Lochan Buidhe Mires SSSI

8.10.102 As Lochan Buidhe Mires SSSI is located approximately 1.9 km away from the Proposed Development (at the closest point), there is not considered to be any potential for direct disturbance to notified features within the SSSI itself during operation of the Proposed Development.

8.10.103 Although there is some potential for indirect effects due to disturbance of foraging birds breeding within the SSSI, levels of activity by notified features of the SSSI (including component species of the breeding bird assemblage) were generally very low, suggesting that the area around the Proposed Development is not of particular importance to foraging birds. As noted above, it is anticipated that at least some component species of the SSSI breeding bird assemblage would be habituated to large artificial structures within the landscape and would continue to forage around the Proposed Development, while sufficient habitat is present in the surrounding area to accommodate any displaced birds.

8.10.104 As such, potential effects of operational disturbance on notified avian features of Lochan Buidhe Mires SSSI are considered to be of negligible magnitude and **not significant** under the EIA Regulations.

Osprey and White-tailed Eagle

8.10.105 As noted above, an osprey nest was identified in the wider area, more than 750 m from the Proposed Development in 2023, although breeding was not confirmed. Historically, a pair of osprey was confirmed to have bred close to this location in 2013 and probably in 2015; again, the nest site was more than 750 m from the Proposed Development. Although birds may nest in this area again in future, it is considered unlikely that they would nest closer to the Proposed Development as suitable habitat is limited.

8.10.106 Although no white-tailed eagle nest sites have been identified within 2 km of the Proposed Development, a roost site was identified more than 500 m away in 2023. While it is possible that white-tailed eagles could roost, or potentially nest, in the wider area in future, it is considered unlikely that they would nest or roost within 500 m of the Proposed Development as suitable habitat is limited.

8.10.107 Furthermore, implementation of the BPP would ensure that any breeding Schedule 1 species such as osprey and white-tailed eagle, as well as any roosting white-tailed eagles, would be protected from disturbance during operational maintenance of the Proposed Development. Potential effects of operational disturbance on the NHZ 5 breeding osprey and white-tailed eagle populations are therefore assessed as being of negligible magnitude and **not significant** under the EIA Regulations.

8.10.108 A single osprey flight was recorded during the 2022 flight activity surveys for the Proposed Development and there were occasional flights during the 2016, 2017 and 2021 surveys for Strathy North Wind Farm. It is anticipated that levels of flight activity could be much higher if ospreys breed in the wider area, as was the case during historic surveys for Strathy North Wind Farm in 2013 and 2015 (detailed in **Appendix 8.3** within Volume 4 of this EIA Report). However, flight activity during historic breeding years (2013 and 2015) was concentrated in particular areas (including the nest site), with very few flights in the vicinity of the Proposed Development.

8.10.109 Overall, low levels of flight activity by white-tailed eagles were recorded during surveys (with 1-6 flights recorded annually during flight activity surveys at Strathy North Wind Farm in 2016, 2018, 2019 and 2021 and none recorded during flight activity surveys completed for the Proposed Development, Strathy South Wind Farm 'Northern Section' Grid Connection or Strathy Wood Wind Farm). Although it is acknowledged that activity could increase if birds nest or roost in the wider area, it is considered unlikely that collision risk would constrain the upward trajectory of the white-tailed eagle population within NHZ 5.

8.10.110 Potential effects of collision mortality on the NHZ 5 breeding osprey and white-tailed eagle populations are assessed as being of low to negligible magnitude and **not significant** under the EIA Regulations.

Summary

8.10.111 A summary of operational phase effects on IOFs is presented in Table 8.9.

Table 8.9: Summary of Operational Phase Effects on IOFs

IOF	Importance Level	Potential Effect	Magnitude of Effect	Potentially Significant Effect?	Targeted Mitigation Required?
Golden plover	International	Disturbance/ displacement	Negligible	No	No
		Collision risk	Negligible	No	No
Greenshank	International	Disturbance/ displacement	Low	No	No
		Collision risk	Negligible	No	No
Red-throated diver	International	Disturbance/ displacement	Negligible	No	No
		Collision risk	Medium to Low	Yes	Yes
		Barrier effects	Low	No	No
Black-throated diver	International	Disturbance/ displacement	Negligible	No	No
		Collision risk	Low	No	No
		Barrier effects	Negligible	No	No
Hen harrier	International	Disturbance/ displacement	Medium to Low	Yes	Yes
		Collision risk		Yes	Yes
Merlin	International	Disturbance/ displacement	Low	No	No

IOF	Importance Level	Potential Effect	Magnitude of Effect	Potentially Significant Effect?	Targeted Mitigation Required?
		Collision risk	Low	No	No
West Halladale SSSI	National	Disturbance/ displacement	Low	No	No
Lochan Buidhe Mires SSSI	National	Disturbance/ displacement	Negligible	No	No
Osprey	Regional	Disturbance/ displacement	Negligible	No	No
		Collision risk	Low to Negligible	No	No
White-tailed eagle	Regional	Disturbance/ displacement	Negligible	No	No
		Collision risk	Low to Negligible	No	No

8.11 Mitigation, Enhancements and Monitoring

Mitigation

Line Marking to Reduce Collision Risk to Red-throated Diver and Hen Harrier

8.11.1 As advised in NatureScot (2016a) guidance, line marking remains the most common and practical form of mitigation for power lines worldwide, and research shows that it can reduce bird collisions by 50-94% (reviewed in Prinsen *et al*., 2012).

8.11.2 Line markers would be installed along key sections of the OHL (on the Optical Ground Wire) where breeding red-throated diver and hen harrier are considered to be at increased risk of collision. The following key areas for line marker deployment have been identified:

- Between towers 1 and 8 to reduce collision risk to red-throated diver; and
- Between towers 13 and 19 to reduce collision risk to hen harrier.

8.11.3 Implementation of line markers along these sections of the OHL is also expected to reduce collision risk to other bird species, including merlin.

8.11.4 It is proposed that the most suitable line marker model and optimal spacing would be determined post-submission in consultation with NatureScot. However, in line with recommendations in Martin (2022), as far as possible, the following line marker design and deployment characteristics would be sought and implemented to maximise detectability.

- As large a surface area as possible.
- A repeat chromatic pattern to generate a high degree of internal contrast so that markers are detectable regardless of landscape background conditions (rather than relying upon the markers contrasting with the landscape background).
- An element of movement or flicker (i.e., an oscillating or rotating device), which will allow markers to be detected more readily than static markers.
- Deployment of markers at small intervals along the OHL.
- High durability of markers to minimise wear and tear.

8.11.5 In line with NatureScot (2016a) guidance, the line markers would be monitored at regular intervals, with maintenance or replacement completed at regular intervals to ensure markers remain functional and in the correct position throughout the lifetime of the OHL component of the Proposed Development.

Habitat Management for Hen Harrier

8.11.6 Potentially significant effects on hen harrier due to displacement resulting from habitat loss during construction of the Proposed Development, or operational disturbance, were identified. To address this, targeted mitigation is proposed to offset potential effects on the Caithness and Sutherland Peatlands breeding hen harrier population.

8.11.7 As part of the Connagill Cluster Outline HMP (**Appendix 7.8**), it is proposed that upland habitat in the wider area (more than 500 m from the Proposed Development to minimise collision risk) will be appraised to identify one or more potential areas where habitats can be managed to improve quality for hen harrier, by increasing foraging resource and providing additional nesting sites.

8.11.8 It is proposed that suitable area(s) and management measures would be agreed in consultation with NatureScot and the RSPB. Consideration will be given to historic breeding territories. Additionally, relevant existing and proposed HMPs for other developments in the surrounding area will be reviewed so that, where possible, opportunities to create corridors or mosaics of good quality hen harrier habitat (rather than small, isolated pockets) can be identified.

8.11.9 The success of the HMP measures would be monitored and reviewed at regular intervals throughout the lifetime of the Proposed Development.

8.11.10 In addition to hen harrier, the targeted habitat mitigation measures are likely to benefit a range of other upland breeding bird species, such as wader species and red grouse.

Enhancements

8.11.11 Although no significant effects were identified for any other IOFs, it is proposed that artificial nest rafts are installed at one or more suitable lochs within the wider area to provide additional nesting opportunities for breeding red-throated and black-throated divers.

Monitoring

8.11.12 In addition to monitoring of the habitat enhancements for breeding hen harrier as part of the Connagill Cluster Outline HMP, and the pre-construction surveys that would be completed as part of the BPP, it is proposed that a programme of ornithological monitoring around the Proposed Development is undertaken by a suitably experienced ornithologist during construction of the Proposed Development. It is likely that the monitoring programme would include surveys for breeding waders, raptors, and divers, including annual checks of any diver nest rafts installed.

8.11.13 Surveys would include the Proposed Development and appropriate species-specific buffers around it, with the aim of assessing how IOFs and other sensitive bird species respond to the construction of the Proposed Development.

8.12 Residual Effects

8.12.1 It was considered that there could be potentially significant effects on red-throated diver and hen harrier due to collision risk and to hen harrier due to displacement resulting from habitat loss during construction of the Proposed Development, or operational disturbance. With these exceptions, potential effects of the Proposed Development on IOFs were predicted to be of low to negligible magnitude.

8.12.2 Following installation of line markers to reduce collision risk to red throated diver and hen harrier (outlined above in Section 8.11), residual effects on the Caithness and Sutherland Peatlands SPA breeding red-throated diver and hen harrier populations are assessed as being of low magnitude and **not significant** under the EIA Regulations.

8.12.3 Similarly, following implementation of the habitat management for hen harrier (outlined in Section 8.11), residual effects on the Caithness and Sutherland SPA breeding hen harrier due to displacement resulting from habitat loss during construction of the Proposed Development, or disturbance during operation, are assessed as being of low magnitude and **not significant** under the EIA Regulations.

8.13 Cumulative Effects

8.13.1 The potential for the Proposed Development to make a material contribution to cumulative effects on IOFs is assessed below with reference to NatureScot (2018c) guidance. A spreadsheet listing cumulative collision risk for wind farms in North Highland (dated 29/05/2024) was provided by NatureScot and was used to inform the assessment of cumulative effects.

8.13.2 The cumulative assessment focussed on key developments in the area around the Proposed Development with the potential to affect the same IOFs. These were identified via the online "Scotland's environment map"[8] and are listed in **Table 8.10**. Where an impact assessment has yet to be completed or no data is publicly available, the developments are scoped out of the cumulative assessment.

8.13.3 It should be noted that the majority of the developments included in the cumulative assessment do not overlap the Caithness and Sutherland Peatlands SPA, and some of the breeding territories of relevant species (greenshank, hen harrier and merlin) recorded during surveys for these developments are likely to be outwith the SPA.

Table 8.10: List of Developments Included in the Assessment of Cumulative Effects on Relevant IOFs

Development Name	Status	Total Permanent Land-take for Development (ha)	No. of Turbines/ Length of OHL/Underground Cable (UGC)	Notes
Baillie Wind Farm	Operational	No information available	21 turbines	No publicly available information*
Bettyhill Wind Farm	Operational	No information available	2 turbines	No publicly available information; details taken from NatureScot (2024) spreadsheet
Bettyhill Wind Farm Phase 2	Consented	9.40	10 turbines	
Bettyhill Wind Farm Phase 2 Grid Connection	Pre-application	Unknown	~31 km	Impact assessment not yet completed*
Kirkton Energy Park (including Kirkton Substation)	Submitted	15.29	11 turbines	
Kirkton Energy Park Grid Connection	Pre-application	Unknown	Not yet confirmed, approximately <1 km	Impact assessment not yet completed*

[8] https://www.environment.gov.scot/ [Accessed May 2024].

Development Name	Status	Total Permanent Land-take for Development (ha)	No. of Turbines/ Length of OHL/Underground Cable (UGC)	Notes
Limekiln Grid Connection	Consented	Direct loss of 1-2m^2 of habitat per pole	~5 km	
Limekiln Wind Farm	Consented	3.38	21 turbines	
Limekiln Wind Farm Extension	Consented	Unknown	5 turbines	
Melvich Wind Energy Hub (including Melvich Substation)	Application submitted	10.65 (plus 18.94 ha of indirect habitat loss); values include temporary habitat loss	12 turbines	
Melvich Wind Energy Hub Grid Connection	Pre-application	Unknown	Unknown	Impact assessment not yet completed*
Strathy North Grid Connection (Strath Halladale to Dallangwell)	Operational	1.70 (plus 1.03 ha of potential habitat modification)	~12 km	
Strathy North Wind Farm	Operational	26.92	35 turbines	
Strathy South Wind Farm (including Strathy South substation)	Consented	28.38 (plus 24.19 ha of permanent habitat change)	35 turbines	
Strathy Wood Wind Farm	Consented	13.00	11 turbines	
Strathy South Wind Farm 'Southern Section' Grid Connection	Anticipated to be Permitted Development	Not assessed	Approximately 5.4 km	Assessment of potential impacts included within Strathy South Wind Farm section 36 application*
Strathy South Wind Farm 'Northern Section' Grid Connection – Alternative Alignment**	Pre-application	Not yet confirmed	Not yet confirmed; approximately 12.5 km	Impact assessment not yet completed*
Strathy South Wind Farm 'Northern Section' Grid Connection – Proposed Alignment***	Pre-application	Not yet confirmed	Not yet confirmed; approximately 10.5 km	Impact assessment not yet completed*
Strathy Switching Station	Pre-application	Not yet confirmed	N/A	Impact assessment not yet completed*

Development Name	Status	Total Permanent Land-take for Development (ha)	No. of Turbines/ Length of OHL/Underground Cable (UGC)	Notes
*Where an impact assessment has not yet been completed for a development, no information was available, or the impact assessment was included within that for an associated development, it was not included in the cumulative assessment; **Only in a scenario with Melvich Wind Energy Hub/substation but without Strathy South Wind Farm 'Northern Section' Grid Connection – Proposed Alignment; ***Only in a scenario without Melvich Wind Energy Hub/substation or Strathy South Wind Farm 'Northern Section' Grid Connection – Alternative Alignment				

Construction Phase

Habitat Loss

8.13.4 Greenshank and hen harrier could each potentially lose a single nest site due to construction of the Proposed Development, although it is considered that birds could nest elsewhere within established breeding areas/territories in the area around the Proposed Development. No other IOFs are expected to lose any nest sites, and the extent of additional habitat that is potentially suitable for nesting birds is considered to be low. Similarly, the extent of potentially suitable foraging habitat that would be lost would also be low.

8.13.5 As such, the assessment of cumulative effects on IOFs due to habitat loss is restricted to potential effects on greenshank and hen harrier, which are summarised in **Table 8.11** at the end of this section.

8.13.6 As can be seen from **Table 8.11**, potential cumulative effects on the Caithness and Sutherland Peatlands SPA breeding greenshank population due to habitat loss would be minimal and is assessed as being of low magnitude and **not significant** under the EIA Regulations.

8.13.7 Strathy South and Strathy Wood wind farms were the only developments other than the Proposed Development for which loss of hen harrier habitat was identified as a potential effect. However, effects were not considered to be significant for either (mitigation for hen harrier was proposed for Strathy Wood Wind Farm to offset potential effects on this species). Similarly, it is considered that implementation of the hen harrier mitigation described in Section 8.11, would reduce the residual impacts on this species to low magnitude and no significant effects are predicted.

8.13.8 Following implementation of targeted mitigation, potential cumulative effects on the Caithness and Sutherland Peatlands breeding hen harrier population due to habitat loss are assessed as being of low magnitude and **not significant** under the EIA Regulations.

Disturbance/Displacement

8.13.9 The proposed BPP measures (outlined above in Section 8.9) would be implemented to avoid disturbance and displacement of breeding birds (including IOFs) and any roosting Schedule 1A species. As such, it is considered that the potential for any breeding IOFs to be displaced or disturbed during construction is negligible. Other developments will follow similar good practice measures to avoid disturbance to protected species (including all breeding birds) in order to comply with relevant legislation.

8.13.10 Although, it is also possible that construction works could deter IOFs from foraging around the Proposed Development, this would be temporary, and there is a large expanse of suitable foraging habitat available within the surrounding area (including within the Caithness and Sutherland Peatlands SPA, which covers 147,726.54 ha; NatureScot, 2023a). Similarly, construction of other developments on the surrounding area will be both temporary and limited in scale.

8.13.11 Furthermore, developments will be at different stages of their life-cycle and construction periods and will not all overlap, thus reducing the potential for significant cumulative effects on breeding, roosting and foraging birds due to disturbance and displacement.

8.13.12 The potential for the Proposed Development to make a material contribution to cumulative effects on IOFs due to disturbance/displacement during construction is therefore considered to be negligible and has been scoped out of the assessment.

Operational Phase

Disturbance/Displacement

8.13.13 With the exception of hen harrier and merlin, the potential for the Proposed Development to make a material contribution to potentially significant cumulative effects on IOFs due to disturbance / displacement during the operational phase is considered to be negligible.

8.13.14 A summary of potential cumulative operational disturbance / displacement effects on hen harrier and merlin is presented in **Table 8.11** at the end of this section.

8.13.15 Potential displacement of a single breeding merlin pair was predicted at Melvich Wind Energy Hub although, it was considered likely that the birds would relocate to another location and effects would be minor and not significant. Given that locations of merlin nest sites can vary considerably between years (Hardey *et al*., 2013), this is considered to be a reasonable conclusion, and is also the case for the Proposed Development.

8.13.16 Cumulative effects on the Caithness and Sutherland Peatlands SPA breeding merlin population due to operational disturbance are therefore assessed as being of low magnitude and **not significant** under the EIA Regulations.

8.13.17 Strathy South Wind Farm was the only development, other than the Proposed Development, for which operational disturbance to breeding hen harrier was identified as a potential effect. However, this was considered to be based on a highly precautionary approach, and as sufficient alternative nesting habitat is available, it was considered that effects would not be significant.

8.13.18 Similarly, it is considered that implementation of the hen harrier mitigation described in paragraph 8.11.7, would reduce the residual impacts on this species to low magnitude and no significant effects are predicted.

8.13.19 Cumulative effects on the Caithness and Sutherland Peatlands SPA breeding hen harrier population due to operational disturbance are therefore assessed as being of low magnitude and **not significant** under the EIA Regulations.

Mortality due to Collision

8.13.20 Residual effects on IOFs due to collisions during operation of the Proposed Development were considered to be of low to negligible magnitude and, with the exception of collision risk to red-throated diver and hen harrier, there is not considered to be any potential for the Proposed Development to make a material contribution to a potentially significant cumulative effect.

8.13.21 A summary of the potential cumulative collision effects on red-throated diver and hen harrier is presented in **Table 8.11** at the end of this section.

8.13.22 The potential for significant effects on red-throated diver and hen harrier due to collision risk was considered to be negligible for many of the developments included in the cumulative assessment. Where collision risk modelling (CRM) was completed, the total cumulative risk was low for both species, with predicted mean annual rates of 0.313 for red-throated diver and 0.464 for hen harrier.

8.13.23 These estimates represent 0.340 % of the Caithness and Sutherland Peatlands SPA breeding red-throated diver population (46 pairs in 2006, NatureScot 2023a) and 1.625 % of the hen harrier population (14 pairs in 1993 to 1997, NatureScot 2023a), with Melvich Wind Energy Hub contributing the highest proportion of total cumulative collision risk for red-throated diver and Strathy North Wind Farm contributing the highest proportion of total cumulative collision risk for hen harrier.

8.13.24 Although the predicted cumulative collision risk to hen harriers is much higher than that for red-throated diver, the CRM values do not take into account any mitigation/compensation, which would likely reduce the figures significantly. Furthermore, the SPA population estimate relates to breeding hen harrier, whereas some of the flight activity on which the CRM was based would be associated with wintering birds, non-breeding adults and immature birds.

8.13.25 Population viability analysis (PVA) completed for Camster Wind Farm (also in NHZ 5) (Whitfield, 2008) demonstrated that, due to the favourable status of the SPA hen harrier population, even with a theoretical annual collision risk of 7.5 female birds, the hen harrier population would remain stable at pre-construction levels, indicating that the SPA breeding population is relatively robust. This finding was supported by more recent PVA of the SPA breeding hen harrier population completed for Strathy Wood Wind Farm (Atmos, 2015) which showed that, even with the additional cumulative collision risk from that wind farm, the population would continue to increase.

8.13.26 Although it is acknowledged that there could be additional cumulative collision risk to both species from developments for which CRM was not completed (including the Proposed Development and other OHLs), this is expected to be negligible, and collision risk from the Proposed Development would result in no more than a marginal increase to cumulative effects on the SPA breeding red-throated diver and hen harrier populations.

8.13.27 The effects of cumulative collision risk to the Caithness and Sutherland Peatlands SPA breeding red-throated diver and hen harrier populations are therefore assessed as being of low magnitude and **not significant** under the EIA Regulations.

Cumulative Barrier Effects

8.13.28 It is considered that red-throated diver is the only IOF that could potentially be significantly affected by cumulative barrier effects, with birds breeding to the south of the Proposed Development potentially having to fly around both the Proposed Development and the Strathy North Wind Farm to forage at the coast.

8.13.29 However, as noted in paragraph 8.10.87 above, a small number of red-throated diver flights have been recorded over the operational Strathy North Wind Farm, indicating that it does not present a barrier to their movement. Additionally, the minimum separation distance between the Proposed Development and the Strathy North Wind Farm turbines is approximately 800 m, with a clear corridor between the two, along the River Strathy, which is considered to be sufficient to allow birds breeding to the south to fly between the two developments to reach the coast.

8.13.30 Alternatively, birds may fly around both developments to the west or east, in which case they would still be following one of the three other identified commuting routes for birds breeding to the south (described above, with additional details provided in Atmos (2019)). Under this scenario, it is considered that the additional distance required to fly around rather than between the developments would be minor and unlikely to result in significant increases to daily energy costs.

8.13.31 As such, cumulative barrier effects on the Caithness and Sutherland Peatlands SPA breeding red-throated diver population are assessed as being of low magnitude and **not significant** under the EIA Regulations.

Table 8.11: Summary of Potential Cumulative Effects on Relevant IOFs

Development Name and Source of Information	Potential Effects of Habitat Loss		Potential Effects of Operational Disturbance		Potential Effects of Collision During Operation (Mean Annual Collision Risk)	
	Greenshank	Hen Harrier	Hen Harrier	Merlin	Red-throated Diver	Hen Harrier
Proposed Development	Potential loss of one nest site; minimal loss of potentially suitable breeding/foraging habitat	Potential loss of one breeding territory; minimal loss of potentially suitable breeding/foraging habitat; however, this would be offset by mitigation proposed in Section 8.11	Potential displacement of single breeding territory (same as that considered under cumulative habitat loss); however, this would be offset by mitigation proposed in Section 8.11	Potential displacement of single breeding territory	CRM not completed, but based on flight activity, potential effects of collision are considered to be of low magnitude	CRM not completed, but based on flight activity, potential effects of collision are considered to be of low magnitude (see **Appendix 8.2**)
Bettyhill Wind Farm NatureScot (2024)	No information	No information	No post-mitigation, disturbance/displacement or foraging loss from operation	No information	0.010*	0.010*
Bettyhill Wind Farm Phase 2 SLR (2022a; 2023a)	No territories within 500 m; potential effects of direct habitat loss not significant	Recorded twice only (in flight over development site); no significant effects predicted	Recorded twice only (in flight over development site); no significant effects predicted	No territories within 500 m; potential effects considered unlikely and not significant	Not assessed	Not assessed
Kirkton Energy Park (including Kirkton Substation) SLR (2022b; 2023b)	No evidence of breeding on/around site; no significant effects of direct or indirect habitat loss	No evidence of breeding on/around site; some historical evidence of breeding in wider area; no significant effects of direct/indirect habitat loss	No evidence of breeding on/around development site; Not assessed	No evidence of breeding on/around development site; Not assessed	Not assessed	0.001

Development Name and Source of Information	Potential Effects of Habitat Loss		Potential Effects of Operational Disturbance		Potential Effects of Collision During Operation (Mean Annual Collision Risk)	
	Greenshank	Hen Harrier	Hen Harrier	Merlin	Red-throated Diver	Hen Harrier
Limekiln Grid Connection ASH (2020)	Not assessed	Not assessed but no evidence of breeding within study area (may have bred in wider area)	Not assessed but no evidence of breeding within study area	Not assessed	Not assessed	Low level of flight activity (10 flights); no display flights. Impact of low magnitude and not significant
Limekiln Wind Farm Infinergy (2012; 2021; 2022)	No breeding territories within 500 m; no potential for any adverse effects	No breeding territories within 1 km; no significant effects	No breeding territories within 500 m; likely no possibility of adverse effects to breeding birds	No breeding territories within 1 km; likely no possibility of adverse effects to breeding birds	Not assessed	CRM not completed; collision risk considered to be negligible and not significant
Limekiln Wind Farm Extension Infinergy (2020)	Not assessed	Not assessed as no breeding records within 2 km	Not assessed as no breeding records within 2 km (and low levels of flight activity)	Not assessed	Not assessed	Not assessed
Melvich Wind Energy Hub ITPEnergised (2023); NatureScot (2024)	No breeding territories within 600 m; no predicted impacts	Not considered to be breeding in local area; scoped out of assessment	Not considered to be breeding in local area; scoped out of assessment	Potential displacement of a single breeding pair; likely that these would relocate to another location and effects would be minor and not significant	0.270*	Not assessed
Strathy North Grid Connection (Strath Halladale to Dallangwell) ASH (2013)	Single breeding territory in proximity to development;	Nearest breeding territory over 1 km away; effects of direct	Nearest breeding territory over 1 km away; no significant effects on	Nearest breeding territory over 1 km away; no significant effects	Not assessed	CRM not completed; only two flights that crossed development were at potential collision height;

Development Name and Source of Information	Potential Effects of Habitat Loss		Potential Effects of Operational Disturbance		Potential Effects of Collision During Operation (Mean Annual Collision Risk)	
	Greenshank	Hen Harrier	Hen Harrier	Merlin	Red-throated Diver	Hen Harrier
	effects of land-take of low magnitude, representing small proportion of overall territory range; no significant effects	habitat loss low to negligible	species conservation status	on species conservation status		likely no effects on species conservation status
Strathy North Wind Farm Environ (2007; 2010); NatureScot (2024)	No direct or indirect effects on distribution or extent of any habitats supporting greenshank	No direct loss of SPA habitat and no net loss of "functioning" habitat for SPA hen harriers	No disturbance expected, therefore no significant effect	No significant disturbance effect	0.018*	0.381
Strathy South Wind Farm (including Strathy South substation) Ramboll UK Limited (2020)	Not assessed; 3-4 breeding territories within 500 m of infrastructure, but adverse effects from displacement predicted to be less than gains delivered via Outline HMP	Not found to breed within site (core survey area) during 2018-19; possibility of birds nesting within site during construction. Residual effects following implementation of mitigation were "potential for slight magnitude of change" (not significant)	Taking a highly precautionary approach, it is possible birds could be displaced from nest sites**, but sufficient alternative nesting habitat is available, and effects would not be significant	Strong likelihood that birds would continue to use closest nesting territory (>500 m away), although likely that the nest would be lost due to felling of plantation during construction	0.004	0.016
Strathy Wood Wind Farm	Habitat loss would be limited as very	Suitability of habitat within site expected to	Any displacement effect likely to be extremely	Very little activity recorded, and site	0.011	0.056

Development Name and Source of Information	Potential Effects of Habitat Loss		Potential Effects of Operational Disturbance		Potential Effects of Collision During Operation (Mean Annual Collision Risk)	
	Greenshank	Hen Harrier	Hen Harrier	Merlin	Red-throated Diver	Hen Harrier
Atmos (2015; 2019)	limited works associated with rivers on site where the birds are most likely to be breeding	decrease naturally, regardless of development, although construction would likely cause more rapid decline in suitability Impact of moderate magnitude and potentially significant, but no significant residual effect following implementation of mitigation	limited (and outwith the Caithness and Sutherland Peatlands SPA), resulting in impacts of a barely perceptible magnitude and a minor, not significant effect	considered to be of negligible value; no significant effects		
*Based on calculations by NatureScot (2024) using current avoidance recommendation (99.5 % for red-throated diver and 99 % for hen harrier; NatureScot, 2018d), which differ from original estimates presented by the developer; **The number of nests considered to be affected was not specified						

8.14 Summary and Conclusions

8.14.1 An assessment has been made of the potential for significant effects of the Proposed Development on IOFs. By implementing the embedded measures detailed in Section 8.9 and the specific mitigation for red-throated diver and hen harrier outlined in Section 8.11, the magnitude of effects of the Proposed Development on IOFs both alone and in combination with other schemes are assessed as being of low to negligible magnitude, and thus non-significant in terms of the EIA Regulations.

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